COMMENT LETTERS REGARDING
JUNE 6, 2003 MERCURY TMDL PROJECT REPORT

Guadalupe River Interests

Beau Goldie, Santa Clara Valley Water District

Todd Maiden, Seyfarth Shaw Attorneys (Guadalupe Rubbish Disposal Company)

NPDES Dischargers

Donald Freitas, Bay Area Stormwater Management Agencies Association

James Scanlin, Alameda Countywide Clean Water Program

Michael Carlin, San Francisco Public Utilities Commission

Bay Area Clean Water Agencies

Dredging Interests

Jim McGrath, Port of Oakland

Ellen Johnck, Bay Planning Coalition

Environmental Organizations

Leo O'Brien, Waterkeepers Northern California

David Beckman et al., Natural Resources Defense Council

Michael Stanley-Jones, Clean Water Fund

Other Interests

Mike Connor, San Francisco Estuary Institute

Luis Arteaga, Latino Issues Forum

Scott Bodensteiner, MEC Analytical Systems, Inc.

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July 14, 2003

Mr. Richard Looker
Mr. Bill Johnson
San Francisco Bay
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Subject: San Francisco Bay Mercury Total Maximum Daily Load Project Report

Dear Mr. Looker and Mr. Johnson:

The Santa Clara Valley Water District (District) is pleased to comment on the San Francisco Bay Mercury Total Maximum Daily Load Project Report (Bay TMDL Report). The District is generally in support of pursuing a planning effort of this magnitude, and recognizes and commends the Regional Water Quality Control Board (Regional Board) for its efforts to take on this difficult task. The importance of and potential impact to the Bay Area necessitates that this be done with sound science to ensure that the resources that will be needed for corrective actions are used effectively and efficiently. This may result in the need for additional review and revision of the Bay TMDL Report to incorporate comments from affected stakeholders.

As you know, the District is working in partnership with the Regional Board to implement a similar planning effort for the Guadalupe River Watershed. Our primary concern is that the approach presented in the Bay TMDL Report is not consistent with this partnership, where we have agreed to pursue a course that will ensure the TMDL is based on sound science, measurable goals, and feasible implementation measures. The District is willing to work with the Regional Board to assist in the application of this approach to the South Bay.

While our comments are generally applicable to the entire scope of the Bay TMDL Report, we have focused our comments on the implications for the South Bay and the Guadalupe River Watershed. The District understands and supports the Regional Board's desire to establish a Total Maximum Daily Load (TMDL) for Mercury in San Francisco Bay. However, the TMDL should:

- be developed in a manner that is consistent with the existing San Francisco Bay Regional Water Quality Control Plan,
- incorporate commitments by the Regional Board to recognize and incorporate into load allocations those existing activities that already reduce mercury loading and/or reduce the methylation of mercury,
- be based on sound science,
- establish a useful, measurable baseline, and
- allocate loads based on realistic assumptions of the feasibility of achievement of individual load assignments.

The District requests the Regional Board to revisit the implicit assumption that all mercury is the same, as this is clearly inconsistent with the body of scientific information in the public domain. The District also requests that the Regional Board replace the bases for estimation of sediment loading with existing models that can more realistically describe sediment processes and, over time, be refined and compared with to demonstrate progress. Finally, the District requests that a realistic, reasonable, and achievable load allocation for the Guadalupe River be proposed, and that the load allocation for the Guadalupe River should recognize the limitations of control measures and takes into account existing activities that reduce mercury loading, that reduce mercury methylation, that restore habitat for endangered species, and that increase the population of endangered species.

The balance of this letter is intended to underscore specific District comments and concerns we have about the Bay TMDL Report.

Comment 1: The Single Box Model is Inconsistent with the Basin Plan Regarding the South Bay

The Bay TMDL Report should be consistent with the San Francisco Bay Region Water Quality Control Plan (Basin Plan) that distinguishes the South Bay below Dumbarton Bridge as a unique water body, and consider economics in setting load allocations before proposing a load reduction of nearly 98% from the Guadalupe River, the highest percent reduction of any other load. It is unreasonable and infeasible to suggest that this magnitude reduction of nonpoint source loading is achievable.

Comment 2: The Linkage Analysis Present in the Bay TMDL Report is Seriously Flawed: The Assumption that All Mercury is the Same is Inconsistent with Current Science; Sediment is Not an Appropriate Surrogate

The Bay TMDL Report focuses on control of mercury bound to sediment particles and makes the assumption[1] that this mercury is quantitatively linked to the amount of methylmercury that enters the aquatic food web. The Bay TMDL Report implicitly recognizes the well-established fact that inorganic mercury in the dissolved state, not particulate mercury, is the form of mercury that is methylated by sulfate reducing bacteria (SRB). The actual linkage presented in the TMDL Report between the particulate and dissolved forms of mercury is based on two statements (see page 39):

- Methylmercury production at any particular site is strongly influenced by total mercury in local surface sediment (Rudd et al. 1983).
- Mercury methylation rates in surface sediment directly relate to mercury concentrations in the sediment when sediment concentrations are less than 1 ppm (USGS 2001c).

These statements are inappropriate for establishing a linkage between particulate mercury and dissolved inorganic mercury that can be methylated by SRB (bioavailable mercury). The work performed by Rudd et al. (1983) was in a highly contaminated freshwater river. More importantly, the method used to measure mercury methylation rates (methylmercury production)

[1] "Reductions in sediment mercury concentrations are assumed to result in proportional reductions in fish tissue and bird egg mercury concentrations", page S-2.

have since been found to be invalid and have been replaced by more sensitive radio-labeling techniques. The data presented by USGS 2001c were collected from freshwater sediments throughout the US. There are several reasons why these results may not be applicable to San Francisco Bay. As the authors point out, "One of the difficulties in analyzing Hg data from such differing ecosystems is the considerable variation in the measurable factors controlling important processes, such as methylation." Furthermore, there are examples of sites where porewater methylmercury concentrations are completely uncorrelated with particulate mercury concentrations. Thus, the entire linkage analysis of the Bay TMDL Report is based on inappropriate examples from the literature. Without, at least, a semi-quantitative understanding of what controls mercury methylation rates in San Francisco Bay, there can be no confidence that costly mercury control measures will produce any environmental benefit at all.

The Regional Board should look carefully at the growing body of data that indicate that inputs of dissolved inorganic mercury (typically referred to as "new mercury") is most directly linked to mercury that is methylated by SRB and that there is little linkage to sediment bound mercury ("old mercury"). Recent experiments involving application of non-radioactive (stable) inorganic mercury to a watershed have shown the importance of new versus old mercury and bioaccumulation. This whole-ecosystem experiment, the Mercury Experiment to Assess Atmospheric Loading In Canada (METAALICUS) has demonstrated the rapid, preferential uptake of new mercury[2]. Recent research in Little Rock Lake (Hrabik and Watras, 2002) has shown a similar result. The authors state "The rapid response observed in this relatively pristine lake indicates that the input of 'new' $Hg^{(II)}$ is an important determinant of waterborne and biotic Hg pools. Although sediments constitute a large Hg reservoir, and although a fraction of that reservoir is recycled back into the water column each year (Watras et al., 1996, 2000), the recycling of 'old' $Hg^{(II)}$ is not the major source of waterborne Hg nor does it dominate the bioaccumulation process." Recent research (Barkay, et al, 1997) also shows that chloride inhibits methylation of mercury; this reduces the potential bioavailability of mercury in sediment in the Bay.

Recent studies demonstrate that dissolved and atmospheric mercury is much more bioavailable than mercury in sediment (Gilmour, et al 2002; Southworth, et al; Hrabik & Watras 2002). The U.S. Environmental Protection Agency (EPA) recently underscored the importance of atmospheric deposition of mercury (EPA 2003) by stating that "Even if all feasible controls for Hg [mercury] are implemented in the U.S., external sources will prevent attainment of water quality standards." EPA indicated "that no matter how strictly EPA regulates mercury reduction from coal-fired electricity generation, point source water dischargers, and other emitters, U.S. waters will be unable to meet Clean Water Act standards for mercury."

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[2] See for example, Krabbenhoft et al. at www.netl.doe.gov . Select publications. Under Conference Proceedings, select the Valuing Externalities Workshop. Go to Session III and to the abstract and presentation slides for **Mercury Transformations on Land and Water (METALLICUS)** (sic)

References:

Gilmour, et al 2002: Response of Methylmercury Production and Accumulation to Changes in HG Loading: a Whole-Ecosystem Mercury Loading Study; Symposia Papers Presented Before the Division of Environmental Chemistry, American Chemical Society, Orlando FL, April 7-11, 2002.

Southworth et al: Effect of Point Source Removal on Mercury Bioaccumulation in an Industrial Pond; submitted to Chemosphere, October 2001.

Habrik & Watras 2002: Recent declines in mercury concentration in a freshwater fishery: isolating the effects of de-acidification and decreased atmospheric mercury deposition in Little Rock Lake; The Science of the Total Environment 297 (2002) 229-237

Watras, et al, 1996, 2000: Watras CJ, Morrison KA, Back R. Mass balance studies of mercury and methylmercury in small, temperate/boreal lakes of the northern hemisphere. In: Baeyens W, Ebinghaus R, Vasiliev O, editors. Regional and global mercury cycles: sources, fluxes and mass balances Netherlands: Kluwer Academic Publishers, 1996 (NATO ASI Series 2. Environmenta 561).
Watras CJ, Morrison KA, Hudson RJM, Frost TM, Kratz TK. Decreasing mercury in northern Wisconsin: temporal patterns in bulk precipitation and a precipitation-dominated lake. Environmen. Sci. Technol. 2000; 34:4051-4057.

Barkay, et al (1997): Effects of Dissolved Organic Carbon and Salinity on Bioavailability of Mercury; Applied and Environmental Microbiology, Nov. 1997 p. 4267-4271

EPA 2000: Water Policy Report, p.16, June 16, 2003

Comment 3: Silts and Clays are the Least Controllable Sediment Fraction, Silts and Clays are the Only Fraction of Guadalupe River Watershed Sediments that Reach the Bay, and More Reliable and Measurable Estimates of Loading are Available

The Water District has conducted recent, extensive studies of sedimentation in the Guadalupe River. These studies are used to support the planning and design of flood protection projects with an eventual commitment of nearly $500 million of public funds, and have been provided to the Regional Board formally as part of the environmental documentation for the projects, and informally via direct communication between staff. The Water District requests that these studies be used as the basis for estimating sediment loading because they provide the best model of the processes occurring in the river, and they provide a measurable baseline for comparison with future observations and refinement of the model.

The sedimentation studies conducted for the District and independently verified by the U.S. Army Corps of Engineers present the following key conclusions:

- The majority of watershed derived bed material load is comprised of sand sized materials. These materials accumulate predominantly in the reach between Highway 101 and Tasman Drive. Even flows that would occur during the 100-year flood event would not have the velocity to move particles of sand size and larger beyond Tasman Drive.

- The only watershed derived materials that actually reach the Bay are silts and clays, and this only occurs with higher flows. Low flows cause the deposition of these materials in the tidal reaches where accretion of bay mud is occurring.
- The District reports estimate that the average annual loading of silts and clays reaching the bay is approximately 37,000 tons (33.6 M kg/yr) or 75 percent of the Regional Board estimate.
- The District studies indicate that the majority of sediments derived from the upper sub-watersheds (where historical mining activities occurred) are trapped behind reservoirs, drop structures and other physical features of the watershed and do not reach the Bay.

The importance of these conclusions is that the least controllable portion of the watershed sediment load is that portion that reaches the Bay (i.e. the wash load of silts and clays), and that only some portion of that is potentially bioavailable. While it is unlikely that any significant reduction in this load is achievable, it is impracticable and unrealistic to assume that it can be reduced by 98 percent. The focus should be on the identification and control of bioavailable mercury, and establishment of loads based on bioavailability.

Comment 4: Sufficient Information Exists to Estimate the Benefits of District Flood Protection Projects and Facility Maintenance

It is stated in the Bay TMDL Report (page 19) that "available information is insufficient to determine the relative proportion of watershed sediment dredged from the river." However, sedimentation studies conducted for the District and independently verified by the U.S. Army Corps of Engineers present the following key conclusions:

- Over time there is a net accumulation of watershed and bay derived materials in the marsh channel reaches of the Guadalupe River. It is estimated that over the next fifty

  years, bay derived sediment will cause a rise of 1.0 to 1.5 feet in the channel near Alviso, and that watershed derived flood deposits may add only an additional 0.1 to 0.5 feet to this. This is sufficient information that can be used to estimate the percentage of watershed derived sediments removed by District maintenance activities and project construction: Between the Southern Pacific Railroad Tracks in Alviso and Tasman Drive, the portion of watershed derived sediment is estimated to range from 6 percent to 33 percent. However, the District does not conduct routine sediment removal in this area due to equipment access difficulties and environmental impacts, and is not planning to do so as part of its capital project.
- Watershed derived sediments comprise all of the materials removed above Tasman Drive (tidal influence end). The District routinely conducts sediment removal between Tasman Drive and Montague Expressway (see Comment 4 below).

This is sufficient information that can be used to estimate the percentage of watershed derived sediments removed by District maintenance activities and project construction.

These are measurable parameters that can be used to verify these estimates and to compare with future actions to demonstrate progress. The District requests these be incorporated into the Bay TMDL Report.

Comment 5: The Bay TMDL Report Does not Incorporate Consideration of District Actions that Reduce Mercury Loading and Reduce Mercury Methylation, as the Regional Board Agreed to Consider in the Memorandum of Agreement with the District Board regarding the TMDL for the Guadalupe River Watershed

A Memorandum of Understanding (MOU) was adopted by the District Board of Directors and the Regional Board in March 2003 regarding the District's contribution to the development of the Mercury TMDL for the Guadalupe River Watershed. The MOU includes a provision whereby "Early Implementation activities in the Watershed which result in decreases in mercury loads, or prevent increases in mercury loads, or decrease mercury methylation, will be recognized by accounting for them in the load allocations and implementation plans associated with the... Bay" TMDL. It is further clarified in the MOU that "[e]xamples of the District's Early Implementation actions include, but are not limited to: (1) the District's capital projects and on-going operational and maintenance activities (including sediment removal)... including mass removal of mercury from the Watershed system..." The Bay TMDL Report does not include any discussion of how the District activities have been accounted for in the load allocations.

Since 1980, the District has conducted extensive sediment removal and erosion control activities in the Guadalupe River. A portion of the sediment removal activities conducted is summarized in the attached table. Using information (already provided to the Regional Board as part of the permit requirements for sediment removal) we compiled, we calculate that the removal of approximately 11,100 cubic yards (15 M kg) of sediment from the Guadalupe River in 2002 resulted in the mass removal of 40 kg of mercury from the watershed. The District's projected removal of 94,000 cubic yards (135 to 167 M kg) of sediment from the Guadalupe River over the next ten years is expected to result in the estimated mass removal of 340 kg of mercury. In addition, the construction of the Lower Guadalupe project is estimated to include the removal of 60,000 cubic yards (85 to 106 M kg) of sediment that will result in the estimated mass removal of 440 to 540 kg of mercury. These are requested to be accounted for in the load allocations for the Guadalupe River.

Other activities that the District requests be accounted for in the load allocations include:

- Past and ongoing erosion repair and control activities that have been conducted since 1980.
- The design of the flood protection projects in the Downtown and Lower sections, currently under construction, and the Upper section, currently in the planning phase, that incorporate measures to reduce sedimentation and erosion by stabilizing beds and banks and improving vegetation and habitat. Elements of the design to include shading to cool water temperatures also reduces methylation, as the rate of methylation is directly proportional to temperature.
- The 2001 Guadalupe Creek Restoration Project that included sediment removal from the active channel of 9.4 M kg that provided a mass removal of 422 kg of mercury. In addition, elements of the project construction included measures to reduce the potential for mercury methylation both structurally within the active channel (minimizing pool depths and maximizing riffles to promote oxygenation of water) and shaded riverine habitat to reduce methylation.

- Construction of bypasses in the Downtown project that reduce sedimentation by both capturing sediment and reducing erosion of the natural channel.
- Sediment removal from other water bodies that discharge to the Bay that result in the reduction of mercury load to the Bay. In 2002, sediment removal from water bodies not in the Guadalupe River Watershed provided a mass removal of 25 kg of mercury.

The first, second and fourth bulleted items can be incorporated into the sedimentation studies and models previously discussed in Comment 3 above and Comment 6 below.

Comment 6: A more Precise Discussion of Sedimentation in the Guadalupe River Watershed is Available

Regarding Section 4: Source Assessment pp 19-20 for sediment load from Guadalupe River to the Bay:

At present, the District operates six reservoirs in the Guadalupe drainage basin: Calero, Almaden, and Guadalupe reservoirs are in the headwater streams to the upper Guadalupe River, and Lake Elsman and Lexington and Vasona reservoirs are along the Los Gatos Creek. Those reservoirs control about 40% of the Guadalupe River watershed. None of them are used for the flood control purposes but they do trap some sediment (might not include the wash load).

PWA (1996) in their sediment assessment study of the Upper Guadalupe River study stated that "The scouring trend observed in the lower reaches of the Existing Conditions model is indicative of the generally sediment-starved state of the river. The dams upstream of the study area and the increased amount of paved surface due to urbanization in the Guadalupe watershed have both significantly reduced the natural runoff sediment load of the Upper Guadalupe River." This is contrary to the indication in the TMDL Report that urbanization increases sediment loading.

One of the recent Guadalupe River sedimentation studies (Copeland and McComas, 2001) also stated that "Field evidence indicates that the Guadalupe River is incising. Recent incision on the order of two or more feet was observed between the USGS gage at Station 148+87 and the railroad bridge at 130+00. Incision of the same order of magnitude was observed between Coleman Avenue at Station 120+00 and I-880 at Station 64+00. The existence of many dumped rubble sills and exposed pipelines between the USGS gage and the upstream model boundary is evidence of historical degradation and continued degradation potential." During their study, the sediment inflow was first based on calculated sediment transport capacity just upstream from Coleman Avenue and on sediment measurements at the USGS gage. Then the sediment inflow was adjusted based on the following two criteria: The criterion for adjustment on the Guadalupe River was reducing deposition between Woz Way and the I-280 bridges to an insignificant quantity to be consistent with observed conditions. The criterion for Los Gatos Creek was reasonable degradation downstream from the Los Gatos confluence. Then sediment inflows of all size classes were reduced by 75 percent on the Guadalupe River and 50 percent on Los Gatos Creek.

From the previous mentioned two studies (PWS, 1996; and Copeland and McComas, 2001), it is clearly indicated that the Guadalupe River is starving with sediment, which also leads us to believe that the Regional Board total sediment load estimate of 44 million kg/yr from the Guadalupe River watershed overstates the actual sediment load. The following sentences are from one of the recommendations suggested by Copeland and McComas (2001) "Uncertainties related to sediment transport of bed-material can be reduced by starting a sediment measurement program on both the Guadalupe River and Los Gatos Creek. Most of the bed-material sediment will move at higher discharges when flow velocity is high. To obtain adequate sediment samples, the sediment sampler will have to be heavy enough to get close to the bed. The collection process may require a stay-line and specialized sampling equipment. Specialists from the USGS should be employed to conduct the sampling program. The program must include laboratory analysis to determine grain size distributions to be useful for sedimentation studies."

References

Copeland, R. R. and D. N. McComas, 2001. Guadalupe River Sedimentation Study, Coastal and Hydraulics Lab. U.S. Army Engineer Research and Development Center, Vicksburg, MS.

PWA (Philip Williams & Associates, Ltd.), 1996. Sediment Transport Modeling Study of the Upper Guadalupe River, Phase 2. Prepared for the San Francisco District Corps of Engineers, April, pp. 2 and 31.

U.S. Geological Survey (USGS) 1980. Sediment Transport of Streams Tributary to San Francisco, San Pablo, and Suisun Bays, California. 1909-66, prepared by G. Porterfield, August, pp. 68 to 90.

Comment 7
The 'implementation measures' that are proposed to accomplish the goal of removing 90% of the sediment load include "mining waste removal actions..., extensive slope stabilization measures in New Almaden..., creek restoration activities, removal of overbank waste deposits, removal of sediment, monitoring programs, ...methylation control measures..." . Additional details are needed on the specifics of these remedial actions in order to assess their effectiveness.

Comment 8
Removal of significant amounts of riparian soil for the purpose of removing mercury would have significant impacts on vegetation that has established over the impacted areas in the intervening years since the mercury was originally deposited. The impact on vegetation and fisheries habitat should be carefully assessed before significant quantities of riparian habitat are disturbed.

Editorial Comments

Section 4: Source Assessment p 12 regarding the discussion of "long-term averages."

The decision in using "long-term averages" in this section is an acceptable approach for this study.

Section 7: Allocations page 45 for the Guadalupe River Watershed.

The first sentence is inconsistent with a similar sentence on page 20 regarding the sediment load. However, the District believes the sediment load estimate should be different than both of these (see Comment 2).

The District appreciates the constructive tone and professionalism that have been exhibited by staff and the Regional Board members during the difficult process of development of this report. We also appreciate the on-going cooperative efforts with Regional Board staff in development of a similar report specific to the Guadalupe River Watershed. We look forward to continuing to work constructively together to develop a TMDL for Mercury in the San Francisco Bay that is based on sound science and sets realistic, measurable, achievable goals. We would appreciate an opportunity to meet with you to discuss our comments and to forge a partnership approach to the development of the Bay TMDL that is consistent with our established process for the development of the Guadalupe River Watershed TMDL. Please contact me at (408) 265-2600, extension 2634, or David Drury of my staff at (408) 265-2600, extension 2721 to arrange a convenient meeting time and place.

Sincerely

Beau Goldie
Assistant Operating Officer
Office of Countywide Program Management

Cc: J. Fiedler, B. Goldie, D. Chesterman, A. Gurevich, R. Narsim, J. Wang, D. Drury, S. Garcia, P. Velasquez

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JUL 16 2003

July 14, 2003

VIA ELECTRONIC MAIL AND U.S. MAIL

William Johnson
Richard Looker
TMDL Project Team
California Regional Water Quality Control Board, San Francisco Bay Region
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Oakland, CA 94612

Re: TMDL Project Report for Mercury in San Francisco Bay;
Comments of Guadalupe Rubbish Disposal Company to Draft Report

Dear Messrs. Johnson and Looker:

On behalf of the Guadalupe Rubbish Disposal Company ("GRDC"), this letter responds to Thomas Mumley's June 6, 2003 letter, inviting comments to the California Regional Water Quality Control Board - San Francisco Bay Region ("RWQCB")'s June 6, 2003 Draft Total Maximum Daily Load (TMDL) Project Report (the "Report"). As an overview, GRDC supports and appreciates this opportunity to work with you in crafting a meaningful TMDL that can be implemented in a reasonable and equitable fashion. We therefore appreciate your attention to the following comments.

Comments

1. The Report Should More Equitably Apportion Reductions in Load and Waste Load Allocations to the Largest Contributing Sources

The Report does not efficiently protect human health and the environment insofar as it fails to allocate primary load reduction responsibilities to the two largest sources of mercury to the Bay. As shown below, "Bed Erosion" and the "Central Valley Watershed" are the two largest sources of mercury releases to the Bay.

Collectively, these two sources account for 73.6% of the mercury in the Bay. However, the Report proposes relatively small reductions in mercury loading from these sources. If the Report were approved, overall mercury loading is supposed to be reduced by approximately 50%. Report at p.13. However, mercury from bed erosion and the Central Valley would only be reduced 31.2% and 46.9% respectively. Greater reductions should be allocated to these larger sources.

Source Area	*Alleged Source (Kg/Yr)*	*% of Total Source*	*Proposed Allocation (Kg/Yr)*	*% of Proposed Allocation*	*% Reduction In Kg/Yr Under Proposed Allocation*
Bed Erosion	460	37.6	220	31.2	52
Central Valley Watershed	440	36.0	330	46.9	25
Urban Stormwater Run-Off	160	13.1	82	11.6	48.8
Guadalupe River Watershed	92	7.5	2	0.3	97.8
Direct Atmospheric Deposition	27	2.2	27	3.8	0
Non-Urban Stormwater Run-Off	25	2.0	25	3.5	0
Wastewater Discharges	19	1.6	19	2.7	0
Totals	**1223**	**100**	**705**	**100**	

Conversely, the Report allocates a a much larger (and inequitable) reduction from the Guadalupe River Watershed (the "GRW"). While the Report anticipates a reduction in reduce mercury loading of 50% overall, it expects a 97.8% reduction from sources in the GRW. This is patently unfair to the current owners of facilities alleged to be "legacy sources" -- especially those current owners who never engaged in mining in any way or profited from mining activities. Furthermore, the the Report fails to allocate reductions to other (albeit smaller) sources (e.g., non-urban stormwater run-off and wastewater discharges). However the overall mercury reduction is set, the load reduction allocation should more equitably share the burden and responsibility for achieving the TMDL's goals.

2. **The TMDL Report Provides No Basis or Rationale for Using the Selected Allocation Scheme.**

A second significant concern – and one that is closely related to the first – is that the Report does not provide any basis or rationale for selecting the proposed allocation scheme. This failure is, in part, responsible for the inequitable allocation placed on the GRW. Specifically, the TMDL Report proposes establishing load allocations and wasteload allocations based on a target sediment mercury concentration of 0.2 ppm in order to achieve the target water quality standard. Yet the TMDL Report nowhere considers alternative allocation schemes nor explains why the method was selected over other potential allocations schemes. There are numerous alternative methodologies for setting allocations. For example, in EPA, *Technical Support Document for Water Quality-Based Toxics Control.* EPA/505/2-90-001 PB91-127415 (Mar. 1991), EPA identified at least 19 different allocation schemes. *Id.* at § 4.2.2. There is ample other guidance available for setting allocation schemes. See, e.g., EPA, *Guidance for Water Quality-Based Decisions: The TMDL Process,* EPA440/4-91-001 (1991); EPA, *Technical Guidance Manual for Performing Wasteload Allocations - Book III, Estuaries,* Part 1, Estuaries and Waste Load Allocation Models, EPA 823/R-92-002 (1992); EPA, *Compendium of tools for watershed assessment and TMDL development,* EPA841-B-97-006 (1997); EPA, *Protocol for developing sediment TMDLs,*. EPA 841-B-99-004 (1999).

Furthermore, any allocation should weigh – and certainly should at least discuss – the many factors that affect the selection of the allocation method. For example, allocations should consider, among other things:

- the types of sources (e.g., point sources, non-point sources)
- management options
- prior pollutant reduction or cleanups
- equity issues
- allocation of control options for non-point versus point sources
- inequitable distribution of costs
- temporal and spatial variability of loads
- future growth
- technical feasibility
- implementability
- likelihood of success

The TMDL Report does not evaluate or even discuss these and other factors. For example, the costs of reducing mercury concentrations from one source might be better used to reduce mercury concentrations elsewhere, for less money. Likewise, certain areas may have already undertaken significant load reduction activities and therefore cannot squeeze out additional reductions without disproportionately high costs.

3. **The Quality and Quantity of Data From the Guadalupe River Watershed is Either Outdated or Statistically Insignificant, and Cannot be Used to Make Assumptions about the Average Concentration of Mercury In and Total Mercury Loading from this Area**

The Report draws several important conclusions based on questionable assumptions. One of those critical assumptions is the determination of average sediment concentrations in the GRW sediments. First, the Report uses old data from 16 samples collected near downtown San Jose between 1980 and 1989. Report at 19. These 16 samples averaged 2.4 ppm of mercury. Based on further calculations, the Report assumes the GRW is contributing 106 kg/yr of mercury to the San Francisco Bay. Report at 10.

By using old data, the report makes the incorrect assumption that the sediment concentrations are the same today as they were over 20 years ago. The Report fails to note that significant remediation occurred at upgradient sources subsequent to the 16 samples being obtained. For example, Santa Clara County and the successor in interest to the New Idria Mining Company engaged in significant remediation of alleged mercury containing calcine piles on former mining properties that historically have been the most significant sources of mercury in the GRW.

Second, the use of 16 samples collected from a relatively small area over a 10 year period does not provide a statistically valid sampling result that can be used to support the far-reaching conclusions about the entire GRW, especially the upgradient areas where the alleged sources exist.

Finally, while the Report acknowledges that other mercury sources within the GRW are constantly being removed due to dredging by the Santa Clara Valley Water District (Report at 19), the Report fails to address how this subsequent and ongoing remediation has reduced further the mercury loading from the GRW. In short, there is insufficient evidence to assume that the average sediments in the GRW contain 2.4 ppm of mercury, or that the GRW currently contributes 106 kilograms per year of total mercury load to the Bay. Rather, this subsequent source reduction should be considered and resulting credits given to the GRW before making final waste load and load allocations for the GRW.

4. **The Report Uses the TMDL to Achieve a More Stringent Water Quality Goal than is Otherwise Allowable**

The Report cites three water quality objectives that it is trying to achieve by implementing the proposed TMDL: 1) the Basin Plan Numeric Objective of 0.025 ug/l (North of the Dumbarton Bridge); 2) the California Toxics Rule Objective ("CTRO") (of 0.051 ug/l) (throughout the Bay); and 3) the Basin Plan Narrative Objective ("controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life"). Report at 6-7.

California has already made a determination of the water quality standard for mercury in its CTRO value of 0.051 µg/l. The RWQCB should not pursue a potentially more stringent standard based upon the Basin Plan Narrative Objective, when a clear numeric objective for mercury has already been set. This is especially true when the RWQCB has not shown how the more stringent water quality standard for mercury relates back to achieving the TMDL objectives for mercury. *See*, Guidance for Developing TMDLs in California, EPA Region 9, (January 7, 2000), ("Guidance"), p. 3 (when a numeric standard is interpreted in terms other than the method through which the standard is expressed, the target must be shown to relate back to achieving the water quality standard). In short, the narrative objective cannot trump the known numeric standard in the absence of a basis to deviate from that numeric standard.

5. **The Report Does Not Appear to Consider Underlying "Background Concentration Levels"**

The GRW is former mining territory, where cinnabar and mercury containing soils are concentrated. The Report and TMDL must recognize that background levels for these constituents are higher than in other source areas that are geographically more deficient in naturally occurring cinnabar and mercury, such as the Central Valley. Consequently, it is inequitable to propose the same background levels for the GRW and other source areas where mercury was not mined.

The RWQCB has an affirmative duty to consider the geographic area impacted by the pollution problem, and in some cases, use a phased approach to establish control measures based on the TMDL.[1] Indeed, EPA regulations provide that load allocations for nonpoint sources and/or natural background "are best estimates of the loading which may range from reasonably accurate estimates to gross

[1] *See* U.S. EPA, Online Guide: Total Maximum Daily Loads: Chapter 2: The Water Quality-Based Approach to Pollution Control, Step Three: TMDL Development; http://www.epa.gov/owow/tmdl/decisions/dec2.html

allotments." 40 CFR § 130.2(g). The Report and TMDL simply do not adequately acknowledge that existing background levels may prohibit waste load reductions to the levels subscribed to in the TMDL. At the very least, further control measures and a phased approach should be implemented to adequately consider various geographic areas and their different background levels for mercury.

6. **The Report Provides Insufficient Guidance on Implementation**

While the Report has a Section entitled "Implementation," there is insufficient practical guidance as to how alleged point and non-point sources are supposed to meet the proposed allocations over the next 20 years. This is particularly burdensome on sources in the GRW, where sources are supposed to reduce their alleged collective mercury releases by 98%. To be useful, the Final TMDL should provide more practical guidelines for how stakeholders can comply with their respective allocations.

7. **The Report does Not Account for Anticipated Reduction in Atmospheric Deposition**

The Report recommends no reduction in atmospheric deposition of mercury into the Bay. This may be due to the fact that the RWQCB may have limited jurisdiction over some sources of atmospheric deposition. However, the final TMDL ought to estimate anticipate some reductions in atmospheric deposition from power plants and other likely sources of atmospheric deposition, in anticipation of complementary regulations being developed concurrently. *See, e.g.*, the pending Clear Skies Initiative being proposed by the White House, which is intended to reduce mercury emissions from power plants by up to 46% by 2010.

8. **The Report Fails to Adequately Address the Issue of Cost Effectiveness in Its Implementation**

Under federal and state law, the Regional Water Boards are required to include TMDLs in their Basin Plans. *See*, Guidance, p. 24, fn 4, citing 33 U.S.C. § 1313(d); 40 C.F.R. § 130.7(d)(2) (TMDLs must be incorporated into the state's water quality management plan. Regional Water Boards must comply with the CEQA when they amend their basin plans. *See* Guidance, at p. 26, citing PUB. RESOURCES CODE §21080. Although "basin-planning" programs have been certified exempt from the requirement to prepare environmental documents, such as EIRs or negative declarations, under CEQA,[2] Regional Water Boards must continue to consider economic factors in relation to physical changes in the environment as part of a CEQA analysis.[3] In summary, Regional Water Boards must identify the reasonably foreseeable methods of compliance with the wasteload and load allocations and consider economic factors for those methods. *See* Guidance, p. 27. The economic analysis is similar to the analysis for water quality objectives. *Id.*

9. **The TMDL is a Rule Subject to a Formal Rulemaking Process**

Finally, the RWQCB's promulgation of a TMDL is a quasi-legislative administrative action which triggers compliance with the California Administrative Procedure Act. Cal. Govt. Code

[2] CAL. CODE REGS. tit. 14, § 15251(g)
[3] *Id.* at §15064(e)

§11342.600, *et seq.* (the "APA"). Specifically, the TMDL is a "regulation" insofar as it is a "rule, regulation, order, or standard of general application . . . adopted by any state agency to implement, interpret, or make specific the law enforced or administered by it, or to govern its procedure." Gov. Code. § 11342.600. As such, the RWQCB must follow the APA's basic minimum procedural requirements for the adoption, amendment, or repeal of administrative regulations. These procedures include but are not limited to a more formal public comment period, an opportunity to make verbal comments at a public hearing and the agency's formal response to written comments, if any.

While California courts have yet to address the specific issue, the Idaho Supreme Court recently held that a TMDL is a rule within the meaning of that state's Administrative Procedures Act. *Asarco Inc., et al. v. State of Idaho, et al.*, (April 25, 2003) Docket No. 27914, page citations not yet available. Similarly, the RWQCB's TMDL, if fully developed, runs the risk of being later stricken as void because it did not comply with California's Administrative Procedure Act, CAL. GOV'T. CODE §§11340, et seq.

In short, the development of this TMDL should follow the formal rulemaking requirements of California's Administrative Procedure Act.

Conclusion

GRDC appreciates this opportunity to work with the RWQCB in creating a TMDL that will protect human health and the environment in an equitable and cost effective manner. Please do not hesitate to contact me, if you have questions about GRDC's comments or if we can provide you with additional information.

Very truly yours,

SEYFARTH SHAW

Todd O. Maiden

TOM:dw

cc: Thomas Mumley (via U.S. Mail)

Alameda Countywide
Clean Water Program

Contra Costa
Clean Water Program

Fairfield-Suisun
Urban Runoff
Management Program

Marin County
Stormwater Pollution
Prevention Program

San Mateo Countywide
Stormwater Pollution
Prevention Program

Santa Clara Valley
Urban Runoff Pollution
Prevention Program

Vallejo
Sanitation and Flood
Control District

B A S M A A

July 22, 2003

Bill Johnson and Richard Looker
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Re: Mercury in San Francisco Bay Total Maximum Daily Load (TMDL) Project Report

Dear Bill and Richard:

This letter is submitted on behalf of the Bay Area Stormwater Management Agencies Association (BASMAA) in response to the invitation to submit comments on the *Mercury in San Francisco Bay Total Maximum Daily Load (TMDL) Project Report (Report)*, dated June 6, 2003.

BASMAA member agencies would like to thank you for this opportunity to comment on the Report and commend each of you for your hard work in finalizing the document. We also recognize the staff to, and participants of, the Regional Monitoring Program for Trace Substances (RMP) and Clean Estuary Partnership (CEP) for their contributions to this milestone.

Impairments to beneficial uses of water bodies in the San Francisco Bay Area are of utmost importance to BASMAA. Furthermore, we agree that reducing impairment of beneficial uses by mercury in the Bay should be a high priority for all Bay Area public agencies and citizens. For storm water programs, concern for elevated mercury concentrations in the San Francisco Bay biota have caused us to refocus a portion of our public resources over the past few years towards reductions of mercury levels in urban runoff that may be contributing to beneficial use impairment in the Bay. BASMAA member agencies plan to continue allocating valuable resources towards regional collaborations such as the CEP and RMP, designed to collect scientific information necessary to develop cost effective measures aimed at improving water quality in Bay Area water bodies. We, as public agencies, take this task very seriously. Therefore, we believe a fair, objective and transparent TMDL and related Basin Plan Amendment based on the best available information and sound science, which states its assumptions and uncertainties throughout the document, is important to its legitimacy, legality, and public confidence.

The preliminary comments contained within this letter are designed to be constructive in nature. Comments are provided to address what BASMAA member agencies regard as unresolved issues related to the content of the Mercury TMDL Project Report. Comments are arranged in three sections: comments on the public review process and stakeholder involvement, general comments on the Report, and comments specific to sections within the Report. As requested by Regional Board staff, specific suggested improvements are

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provided for each issue discussed. Most of the suggested improvements entail a change in the text to clarify language within the Report, thus reducing public misconceptions and false expectations by instead stating assumptions and uncertainties in a transparent and clear manner.

It is our understanding that comments such as these will be considered by Regional Board staff prior to developing amendments to the Water Quality Control Plan for the San Francisco Bay Region (Basin Plan), which are tentatively scheduled for adoption later this year. While we believe our exchange of information at this point in the process may be useful, we want to emphasize that notwithstanding this and prior public outreach efforts, the Regional Board needs to provide sufficient time for a meaningful official public comment and scientific peer review process once a proposed Basin Plan Amendment is prepared.

Because of the significant implications of such a Basin Plan Amendment, the demands it will impose, and the amount of time and public resources it will likely consume, we want to emphasize that our current exchange of information will be no substitute for providing adequate time (in our estimation at least 6 to 9 months rather than the typical 4-8 weeks) for meaningful peer review of and public comment on an actual Basin Plan Amendment.

In addition, even though the Regional Board is exempt from certain provisions of the California Environmental Quality Act ("CEQA") with respect to Basin Plan amendments, the Regional Board is still obligated to consider the potential environmental impacts of the proposed amendment. CEQA policy demands that the Regional Board make available information relevant to the proposed amendment's impacts "as soon as possible" and consider comments "at the earliest possible time in the environmental review process." (See Public Resources Code § 21003.1.) However, the Regional Board's June 6, 2003, transmittal states that the required CEQA analysis will not be provided until the release of the staff report supporting the proposed amendment. This simply does not allow us, or other members of the public, sufficient time to provide comments that will be meaningful or useful to the Regional Board.

Finally, as you know, the proposed implementation plan has many new proposed requirements that storm water programs may be required to implement. Therefore, we ask that the suggested improvements contained within this comment letter be incorporated into a revised TMDL Mercury Project Report and staff recommendations for the proposed Basin Plan Amendment. To clarify these suggested improvements and proposed requirements, we request that Regional Board staff from the TMDL section and storm water permitting section meet with BASMAA representatives during the preparation of Basin Plan amendments and associated staff reports to discuss our concerns and work together to incorporate the suggested changes to the TMDL Project Report and implementation plan into a revised TMDL Project Report and proposed Basin Plan Amendment.

STAKEHOLDER AND PUBLIC REVIEW PROCESS:

As you know, BASMAA supports a transparent stakeholder and public review process and we believe that involving all stakeholders throughout the process is a goal the Regional Board should strive for during the development of all TMDLs and associated Basin Plan amendments. Therefore, the lack of: 1) more meaningful communication between Regional Board staff and stakeholder representatives regarding specific aspects of the Report relevant to those stakeholders, and 2) assurance of a full, adequate, and meaningful peer review and public review process for a proposed Basin Plan Amendment, are of substantial concern.

The lack of meaningful communication from Regional Board staff is evident in the new language and calculations that are apparent throughout the Report. When compared to the draft version (2000) and the presentation by Regional Board staff to the Mercury Council, on October 31, 2002, many differences are of concern. For example, estimates of total sediment loads used to calculate current mercury loads from urban and non-urban storm water runoff have changed. These changes have created a greater proposed load reduction allocation for urban runoff programs. These changes were not discussed with municipal storm water program representatives prior to the release of the TMDL Project Report.

Issues like this could have been clarified and resolved early in the process if the quantity and quality of communication between the Regional Board staff and stakeholders (storm water program representatives in this case) was improved. In fact, in a meeting between Regional Board staff and BASMAA representatives on November 19, 2002, we suggested that a process for ongoing discussion and review should be established. Regional Board staff agreed to try to distribute timely updates that affect storm water programs. Unfortunately, the aforementioned process and timely updates never materialized. Quite the opposite, comments on the TMDL Report were requested, but as indicated in Tom Mumley's letter, dated June 6, 2003:

"...staff do not intend to formally respond to comments received or revise the report."

In other words, the message to us has been "the Report is finalized". In our opinion, this is not an adequate, meaningful, nor transparent stakeholder or public review process. If a *draft* Report had been released to stakeholders and an opportunity for input provided before its finalization, we believe the report could have adequately addressed many of these issues.

Suggested Change – We strongly suggest that the Regional Board improve the public review and stakeholder process for the development of future TMDLs (e.g., PCB TMDL for the San Francisco Bay). To improve this process, Regional Board staff should provide updates to relevant stakeholders before a TMDL Report is finalized. Likewise, we strongly suggest that stakeholders be allowed to review and provide comment on the Staff's version of a Basin Plan Amendment *before* it is officially "proposed" and released for public comment. This will allow stakeholders to comment on documents before they are likely institutionalized. Additionally, this will allow stakeholder representatives to better prepare constituents for proposed requirements and implementation actions that will require an increased allocation of limited resources.

Lack of Response to Comments

Many of the comments presented in this document were previously communicated to Regional Board staff by BASMAA member agencies (SCVURPPP 2002 and BASMAA 2002). However, on most issues no response was given by Regional Board staff. We are cognizant of the fact that State resources are limited at this time; however responding to comments and concerns of stakeholders that will be directly affected by the proposed TMDL is an important task and there is little incentive or point in commenting if our input is ignored or no feedback or dialogue will be forthcoming prior to release of the proposed Basin Plan Amendment. For example, one of the major points that was made in previous comments by BASMAA member agencies was that large areas of uncertainty, including the calculations used in the source assessment and the controllability of air deposition included in the urban storm water load, were not adequately addressed in the draft TMDL Report or presentations by Regional Board staff. After review of this TMDL Report, it appears that it still does not adequately address the uncertainties behind loading calculations and the controllability of indirect air deposition.

Suggested Change – We suggest that the Regional Board respond to comments received, in a timely manner and in a format that is directly responsive to the input provided, during the development of future TMDLs and in advance of the release of proposed Basin Plan amendments. If stakeholders know their comments will be addressed and expect to see direct responses to them, they will likely have comments and concerns that are of interest and useful to staff.

GENERAL COMMENTS:

Definition of "Controllable" and Responsible Parties

The term "controllable" is used throughout the report. Staff's use of the term appears to be based on what regulatory mechanisms are currently available to the Regional Board rather than on whether the actual source of the pollutant is actually subject to regulatory control by the discharger or whether the resultant amount of loading can be subject to technically feasible and economically reasonable management or treatment. For example, as described later in this letter, a significant portion of the estimated current urban storm water load and proposed allocation is likely attributable to indirect air deposition onto the watershed. BASMAA believes that this portion of the urban runoff load is likely to continue for many years to come, begging the question of whether this portion of the urban runoff load can be controlled by urban runoff programs in any meaningful, let alone technically feasible and economically reasonable, manner.

In contrast, we have faith that the total load of mercury originating from sources that are truly controllable by urban runoff programs will be reduced over time through pollution prevention activities. However, neither local municipalities (nor the Regional Board) have jurisdiction to regulate the mercury continuously deposited onto the watershed from global or local atmospheric sources, and therefore it makes no sense to assign/allocate these sources as the legitimate responsibility of urban runoff programs.

In fact, atmospheric deposition directly to the Bay is considered elsewhere in the Staff Report to be "uncontrollable", according to the proposed implementation plan for atmospheric deposition:

> *"In view of the degree to which uncontrollable sources appear to dominate Bay Area air concentrations and presumably deposition, load reductions do not appear feasible at this time."*

This is just one example of how the terms controllable and uncontrollable sources are inconsistently used and misused to establish waste load allocations. We find that the lack of a formal definition of these terms and analysis concerning the legitimacy of their application causes confusion and results in the significant misallocation of the waste loads set forth in the Report. Therefore, we believe that it would be hard to show beyond a reasonable doubt that any of the sources is more or less controllable than any other, particularly with the relatively limited data currently available regarding controllability early in a 120-year TMDL implementation period.

Suggested Change – For the purposes of this TMDL Report, which assigns preliminary load and waste load allocations, we suggest using a more objective, scientific, and prudent approach of assuming that all sources have the same level of controllability or uncontrollability unless scientific evidence is developed to the contrary. Prior to the adoption of other TMDLs, we suggest that when calculating current loads and waste load allocations the Board should adopt a definition of controllable and uncontrollable sources based on factors such as feasibility,

economic capacity, and legal jurisdiction of the dischargers. As part of the adaptive implementation plan, these definitions should be used when revising preliminary load and waste load allocations that were assigned in the Mercury TMDL Report. Furthermore, the responsible parties for which the loads originated, should only be assigned the loads that are controllable; allocations should not be assigned to dischargers just because the parties happen to be subject to the Regional Board's jurisdiction.

Need for Sensitivity Analysis and Description of Uncertainties

As described in the Report, water and sediment circulation patterns, biological interactions, and contaminant transport processes, are complex in the San Francisco Bay estuary. We acknowledge that adequate data is currently not available to estimate current loads from most sources and predict the recovery of the Bay with certainty. Therefore, we believe it is important to state inherent assumptions and uncertainties throughout the Report and illustrate these uncertainties in projected recovery simulations.

One way to illustrate uncertainties is by conducting a sensitivity analysis of estimated mercury loads from particular sources. Therefore, scenarios could be developed which could be displayed in projected recovery curves under different assumptions based on the sensitivity of recovery curves as a result of changes in the estimated load from a particular source(s).

This type of analysis would better explain the uncertainties with load calculations and demonstrate how the Bay would respond under a variety of different assumptions.

Suggested Change – Revise the source assessment and load allocation sections of the Report to include ranges of estimated current loads and waste load allocations, instead of single values. Single values typically are institutionalized quickly and may give the public significant misconceptions regarding the mercury load from particular sources. Additionally, perform a sensitivity/uncertainty analysis on the projected recovery curves based on a variety of scenarios. The ranges of estimated current loads and waste load allocations would aid in this exercise. Once completed, the recovery curves under a variety of scenarios should be illustrated in the Report. The selection of such scenarios should reflect the model parameters with greatest uncertainty (e.g., loading due to bed erosion).

Accounting and Allocations

Full accounting of sources AND losses (as shown in table 4.1 and figure 4.1) should be carried through the entire TMDL. There is no scientific basis and it is not prudent to stop accounting for all known sources and assumed losses (as shown in table 7.1 and figure 7.1) This jeopardizes any reasonable assurance that implementation of the TMDL will attain water quality standards. The values shown for the sources and losses could and most likely will change over the course of the planned multi-decadal TMDL implementation period.

As pointed out in the Project Report, mercury loads are equal to sediment loads times sediment concentrations. Yet the approach used later in the Report to determine TMDL allocations varies depending on the source. Sometimes the allocations are based on mercury loads but often they are driven by only one of these factors – sediment concentrations. We believe TMDL allocations should be established on a consistent basis – one based on mercury loads.

Given the high level of uncertainty, and the current inconsistent and highly subjective definition of controllable (as discussed above), the science does not support any other preliminary allocation scheme than one based on requiring each source AND loss to be the same

proportion of the solution as it is of the problem. That is, for a given source, its percent of the solution (i.e., allocation or reduction) should be equal to its percent of the problem. Losses should be zero percent of the solution since they are equal to zero percent of the problem. However, it is important that their negative loads are maintained so their allocations should remain equal to or less than their current negative loads. Re-calculating the values in table 7.1 based on these concepts yields allocations:

- that are objective, acknowledge the lack of scientific evidence of controllability or uncontrollability, and are established on a consistent basis – mercury loads;
- that are more evenly distributed where the burden on any one source is reduced; and
- in which all sources (including those that need further investigation) and losses remain accounted for in one place.

Suggested Change – Table 7.1 and figure 7.1 should be expanded to include all "sources" and "losses" (i.e., same as table 4.1 and figure 4.1). In addition, based on the concept that "percent of the solution" = "percent of the problem," Table 7.1 (and similarly figure 7.1) should be modified as follows:

TABLE 7.1: Proposed Load and Waste Load Allocations

Sources	Current Load Hg kg / yr	Percent of Problem	Allocation Hg kg / yr	Reduction Hg kg / yr	Percent of Solution
Bed erosion	460	38	266	194	38
Central Valley watershed	440	36	254	186	36
Urban runoff	141**	12	79	62	12
Guadalupe watershed	92	8	54	38	8
Atmospheric deposition					
Direct	27	2	16	11	2
Indirect	55	5	32	23	5
Non-urban runoff	<0**	TBD	TBD	TBD	TBD
Wastewater	19	2	11	8	2
Local mines	TBD	TBD	TBD	TBD	TBD
Contaminated Bay margin sites	TBD	TBD	TBD	TBD	TBD
Subtotal	≈1,219	>100	705*	514	>100
Losses					
Transport out Golden Gate	(1,400)	NA	(1,400)	0	NA
Dredging and disposal	(150)	NA	(150-430)	0	NA
Evaporation	(190)	NA	(190)	0	NA
Subtotal	(1,740)		(1,740)	0	
Total	(521)		**(1,035-1,315)**	**514**	

All values rounded to nearest integer

* Based on proposed total allocation presented in TMDL Project Report

** Estimated indirect air deposition (55 kg/yr) removed from estimated urban and non-urban storm water runoff current load. See specific comments on p. 9 of this comment letter, and allocations, pp. 10-11

TBD = To be determined

NA = Not applicable

SPECIFIC COMMENTS:

Problem Statement (Section 2)

Although the document is specific to the mercury pollution in the San Francisco Bay (Bay), it would be useful to include a statement regarding the issue of mercury pollution worldwide. Context is important when stating an environmental issue such as mercury pollution in the Bay. Readers should know that San Francisco Bay is not the only water body containing elevated levels of mercury. Mercury pollution has recently been recognized as a global problem. In February 2003, the United Nations agreed that, "there is sufficient evidence of significant global adverse impacts from mercury and its compounds to warrant further international action to reduce the risks to human health and the environment."

***Suggested Change**:* Include a statement or two indicating mercury pollution in surface waters is a global issue, and is not specific to the San Francisco Bay.

Mass Budget Approach (Section 3)

The text in the mass budget approach section of the Report states:

> *"Mercury fate and transport processes within the bay vary significantly throughout time and space, and available data are insufficient to support detailed analyses without over-interpreting the limited data. Therefore, this report relies on a simple model to represent the San Francisco Bay and some of its basic processes. The advantages of simplicity—the ability to identify and prioritize reasonable actions without over-interpreting the data—outweigh the apparent realism that could be attainable with a more complex model (Harte 1988).*

We agree that the Bay is a complex system and a simple (one-box) model has its advantages as described. However, a simple model also has inherent disadvantages that are not described in the Report. For example, sediment transport processes of the Bay can vary drastically between segments and with time, making the one-box model far too simple to accurately estimate mercury sources and losses over a given timeframe. Therefore, it is important to include language stating that the complexity of the system could greatly undermine the assumptions and calculations made using the one-box model. Simply stating the estimates made were based on available data does not go far enough to explain the uncertainty of the conclusions that are being drawn in the Report and upon which all load calculations are based.

Suggested Change – Include language indicating that using a one-box model incorporates great uncertainty in estimating mercury sources to, and losses from, San Francisco Bay. Additionally, we request that a discussion of the disadvantages of using a one-box model to the same extent the advantages were discussed.

Source Assessment (Section 4)

The following comments and suggested changes are related to sub-sections of Section 4, Source Assessment:

- **Calculations and Assumptions:**
  - ***Bed Erosion*** – BASMAA agrees that bed erosion is likely the largest source of mercury to the bay, given past resource management history(i.e., mining) and the likelihood of bed sediments continuing to erode. Therefore, we believe providing the best estimate of bed erosion for the entire bay is of utmost importance when determining sources of mercury. The report's estimates do not attempt to include bed erosion from segments other than San Pablo and Suisun Bays. Although burial and erosion estimates have not been published for these segments, it appears that preliminary estimates could be calculated and included in this Report. A large amount of resources have been used to calculate load estimates from other sources, which are based on very little information, so why not attempt to assess potential bed erosion from the south, lower and central bays? BASMAA believes that without an assessment and quantitative estimate of bed erosion, the largest source of mercury to the bay may be grossly underestimated, potentially having great consequence on estimated recovery times and necessary load reductions assigned to other sources.

    Suggested Change – Include estimates of potential bed erosion from segments other than Suisun and San Pablo Bays when calculating the mercury loadings to the Bay. State assumptions and uncertainties related to these estimates.

  - ***Storm Water*** – As indicated in previous comments from storm water agencies on the Mercury TMDL for the San Francisco Bay (SCVURPPP 2002, BASMAA 2002), BASMAA has many concerns regarding the calculations used to estimate current storm water loads. BASMAA continues to suggest that the methods and a portion of the data used to calculate urban storm water runoff mercury loads are inappropriate as a basis for establishing regulatory criteria or actions. In particular:

    - **Use of bedded sediment data** – As described in previous comments from BASMAA member agencies, we believe that the use of bedded sediment data from the Joint Stormwater Agency Project report to establish current loading estimates for urban and non-urban storm water introduces very high uncertainty. Loading estimates made in the Joint Stormwater Agency Project were very rough estimates based on available data collected for a different objective, and were only calculated at the request of Regional Board staff. The San Francisco Estuary Institute (SFEI) has more recently commented that it is not possible to determine the bias and error associated with loading estimates based on bedded sediment concentrations. The Clean Estuary Partnership/SFEI study to estimate pollutant loads from the Guadalupe River is designed to produce better loading estimates (at least for one local tributary) based on suspended sediments and demonstrate improved methodologies.

      Suggested Change - We suggest that the Report be revised to better identify and explain the ranges and associated uncertainties of storm water loading estimates. The text should also mention the issues regarding the compatibility of bedded vs. suspended contaminant concentrations used in the Report. We also suggest that procedures or criteria be outlined for refining these estimates during adaptive implementation process.

- ***Atmospheric Deposition*** – A previously mentioned, the Report includes estimates of dry and wet deposition of mercury directly deposited onto the bay. However, estimates of indirect deposition onto the watershed are included in the storm water load estimates, not in the atmospheric deposition load. As the TMDL Report states, as much as 55 kg/yr (nearly 30%) of the storm water mercury load could be from indirect atmospheric deposition onto the watershed.

  Suggested Change – The estimated 55 kg/yr, attributable to indirect air deposition, should be removed from the storm water load estimate. This load should instead be included in the air deposition source category as "indirect atmospheric deposition" and itemized separately in Tables 4.1 and 7.1.

Linkage Analysis (Section 6)

Comments regarding the linkage analysis were previously submitted by BASMAA member agencies (SCVURPPP 2002). We are disappointed that no response to these comments has been issued and that further dialogue on this critical component of the TMDL has not occurred. Therefore, because of their critical importance from our perspective, we are reiterating our prior comments here.

The report and previous presentation simply assume without justification that a linear relationship exists between changes in total mercury concentrations in bay sediments and changes in fish tissue and bird egg mercury concentrations. We believe a much more detailed linkage analysis is needed, which would be incorporated into an expanded conceptual model and analysis of mercury cycling in the system. This should include a more thorough quantitative analysis of the following:

- percent of mercury in sediment transported to methylating regions in the Bay;
- percent and rates of mercury in methylating regions converted to methyl mercury; and,
- percent, rates, and risks of mercury entering the food web at various locations in the bay and various trophic levels.

BASMAA will continue to support the efforts currently underway within the CEP, RMP and other scientific programs aimed at providing such analyses.

Suggested Change – We suggest that the Implementation and Adaptive Management sections of the Report include specific language stating that:

> *The uncertainty associated with the current linkage analysis is extremely high due to limited data. The relationship between sources, loadings and wildlife endpoints is essentially unknown at this time. If new scientifically valid information is available in the future regarding the effects of load reductions in the Bay, load allocations, recovery projections, and requirements outlined in the implementation plan will be expeditiously and explicitly revised to reflect this current state of knowledge regarding sources of impairment and recovery of the Bay.*

- **Mercury Sources and Sediment** – The last paragraph at the bottom of page 36 states that:

  "...tributaries, such as the Sacramento and San Joaquin Rivers, the Guadalupe River, and other local tributaries carrying storm water runoff, are the largest sources of mercury to San Francisco Bay."

  This statement is misleading, and should be qualified to acknowledge that the estimated relative contribution of mercury from local tributaries is small when compared to larger sources (e.g., Central Valley) and bed erosion may be the largest contributor to impairment of beneficial uses in the Bay.

  Suggested Change – Change statement to appropriately qualify the relative contribution of mercury from local tributaries and to indicate that bed erosion is estimated to be the largest contributor to impairment of beneficial uses in the Bay.

- **Methylmercury Production** – As described in the Report, methylation is a key pathway in the bioaccumulation of mercury in biota (i.e., fish tissue, bird eggs, and humans). Without mercury methylation, we would likely not have elevated mercury concentrations in these biota and therefore would not need a TMDL. Therefore, we believe it is critical not to downplay the importance of methylation in the Report. To meet the wildlife and fish tissue targets, the Report indicates that loading of mercury from "controllable" sources must be reduced (Section 7 – Allocations). However, the Report relies on only two citations (Rudd et al. 1983 and USGS 2001c) in developing the proposed linkage between total mercury concentrations in surface sediment (i.e., sources) and methylmercury production. Furthermore, based on this proposed linkage, the Report states definitively on page 38 that:

  "Reducing mercury loads will reduce methylmercury production"

  BASMAA agrees that reducing mercury loads is an important goal, but finds that this statement is misleading. As you know, the scientific community does not currently agree that this statement is in fact true for the Bay. Many scientists believe that methylmercury production may be better reduced through the management of methylating regions (e.g., wetlands). Therefore, it may give the public false expectations and misconceptions about whether reduction of sediment concentrations is accepted by the scientific community to be the most critical variable in reducing mercury impacts on biota.

  Suggested Change – As recently suggested by Regional Board staff, the TMDL process should embrace the scientific method of stating hypotheses and testing these hypotheses through the adaptive management process. Therefore, in the essence of the scientific method, we suggest that this statement be revised to include language such as, "Based on these studies our working hypothesis is that reducing mercury loads will reduce methylmercury production in all segments of the San Francisco Bay".

Allocations (Section 7)

- **Load and Waste Load Allocations** – The value (1,420 kg/yr) assigned to *Current Mercury Load (Total)* in Table 7.1 is inconsistent with the rounded value (1,220) in Table 4.1. Additionally, no reductions are assigned to air deposition or non-urban storm water.

  Suggested Change – Revise Table 7.1 current load column and the text under point 1. on page 50 to be consistent with the above comments and Table 4.1.

- **Urban Storm Water Runoff** – The following concerns are related to the proposed load allocations for urban runoff:

  - **Controllable vs. Non-Controllable** – The Report suggests that "controllable" sources of mercury are in part responsible for mercury in sediments from urban storm water. Furthermore, it states that:

    > *"Atmospheric deposition and natural background also contribute to the mercury in urban runoff. These contributions are assumed difficult to control".*

    BASMAA appreciates the acknowledgment that these sources are hard to control. However, that acknowledgement has not been accounted for in the allocation. Since we have heard no response to questions posed by SCVURPPP in response to the Regional Board's presentation at the October 31st, Mercury Council meeting, we reiterate those questions here:

    1. Is the atmospheric deposition component (estimated to be 55 kg/yr) of the storm water load actually controllable? If so, on what basis has that conclusion been reached?
    2. Who, if anyone, has the jurisdiction to control inputs from atmospheric deposition?

    As you know, storm water programs do not have the jurisdiction to control atmospheric deposition of mercury onto local watersheds. Regulatory control of atmospheric metal deposition is the responsibility of international, national, state and local air quality agencies. Therefore, it is inappropriate to include the estimated 55 kg/yr of mercury from indirect deposition in the storm water runoff load estimates.

    Suggested Change - Remove the estimated 55 kg/yr of mercury from the proposed storm water runoff loads estimated to be 160 kg/yr for urban and 25 kg/yr for non-urban, and assign the load to the air deposition source category. The resulting estimate of mercury from urban storm water runoff would be 141 kg/yr for urban and < 0 kg/yr for non-urban, based on the percent of urban land area and non-urban land area (KLI 2002). If implementation activities by urban storm water programs are found to control part of the mercury from air deposition or non-urban sources, these reductions can be addressed through the adaptive implementation process.

  - **Thermometers as an urban runoff source** – There is no evidence to suggest that thermometers are a source of mercury to urban runoff.

    Suggested Change – Remove references to thermometers in two places in the Report:
    - *(p. 44, Urban Storm Water Runoff, second sentence)* - ...such as improperly discarded fluorescent lights, ~~thermometers,~~ other ...
    - *(p. 56, Urban Storm Water Runoff, third sentence)* -...including fluorescent light bulb ~~and thermometer~~ collection and disposal programs,...

Use of population as a load allocation scheme – When assigning individual waste load allocations to urban runoff programs, we are uncertain as to whether the service area population of each urban runoff management program should be used. Individual waste load allocations

could instead be assigned on the basis of other parameters, such as the percent of Bay Area urbanized land area within each storm water program service area, or some combination of population and urbanized land area.

> ***Suggested Change*** – We suggest that the Regional Board work with urban runoff management programs to reconsider the allocation basis and scheme for the individual waste load allocations for urban runoff, and revise table 7.2 as needed and appropriate.

- **Projected Recovery** – Two different values of "total current mercury inputs" are used in the Report and in the supporting document (i.e., SFBRWQCB 2003g). The Report uses the value of 1,420 kg/yr, while the supporting document appears to mention both 1,420 and 1,220 kg/yr. As previously discussed in the Source Assessment-Mercury Source Assessment and Methodology Section of this document, the estimated total should be 1,219 kg/yr, not 1,420 kg/yr.

  It is not clear which of these values was used to predict the long-term response with and without proposed implementation measures. It is important to mention that if the 1,420 kg/yr was used in any of the modeling scenarios for projected recovery, the recovery time could be drastically affected. For example, if the recovery curve for current loads, with bed erosion phase-out (Figure 7.2) was presented in error using the 1,420 kg/yr value, the slope of the curve may be steeper than estimated.

  Suggested Change – Review the values for total current mercury loads used to calculate the recovery curves for mercury in San Francisco Bay. Revise the text and tables of the above documents, and, if needed, the figures and projected recovery times.

Implementation Plan (Section 8)

BASMAA has a variety of concerns related to the proposed implementation plan. As mentioned in the opening paragraphs of this document, BASMAA representatives request that a meeting(s) with Regional Board TMDL and Stormwater Permit staff be scheduled to further discuss our preliminary suggestions for improvements and clarification of the proposed implementation actions presented in the Report, as presented below.:

- **Objectives** – The objectives of the implementation plan state that:

  > *"In developing implementation actions for various sources, this plan takes into consideration the.....the feasibility and cost of control".*

  However, within the proposed urban runoff implementation plan, the consideration of feasibility and cost of control is non-existent. Many of the suggested actions (e.g., additional pollution prevention activities, capture and treating storm water) may be infeasible and/or cost prohibitive. An analysis of each and its feasibility and cost must be forthcoming.

  Suggested Change – Include an analysis describing how feasibility and cost of control was considered when developing the proposed implementation actions.

- **Urban Storm Water Runoff** – The following concerns and suggested changes are related to the proposed urban storm water runoff implementation plan.

- **Lack of linkage between proposed actions and allocations** – Within the Report, no clear linkage is established between the proposed implementation actions for urban runoff (listed as proposed requirements on page 57), the associated proposed allocations and feasibility and cost. BASMAA agrees that pollution prevention activities and storm water treatment may reduce some of the estimated urban runoff mercury load. However, it is unclear as to what extent reducing controllable sources can help meet proposed allocations and to what extent feasible and economically reasonable storm water measures can be employed.

  Suggested Change – Revise implementation requirements for urban storm water programs by identifying those proposed implementation activities that are technically feasible and economically reasonable as "early implementation actions" and include a statement that this list may be refined as part of continuing efforts by the storm water programs and other stakeholders. A preliminary draft model in Attachment 1 is intended to serve as a starting point to accomplish this task, and therefore, when finalized, will supersede the list of proposed requirements on page 57 of the Project Report.

- **Demonstrating Compliance** – Given the high uncertainties in current urban runoff load estimates presented in the Report and equivalent uncertainty regarding the feasibility, cost and effectiveness of storm water measures in reducing loads, BASMAA is very concerned about demonstrating compliance with the proposed requirements in the implementation plan in quantitative terms. Quantifying numeric load reductions via storm water control measures poses a significant problem for BASMAA member agencies, given the uncertainties and gaps in available baseline information. In addition, it is not clear how often the 5-year average is to be calculated, or how these results should be coordinated with the 5-year adaptive review of the TMDL. Furthermore, the first recommended method for storm water agencies to demonstrate compliance with proposed waste load allocations (i.e., quantify new mercury loads avoided through pollution prevention, sources control and treatment efforts) does not take into account that the data used to estimate current mercury loads is, at a minimum, two years old.

  Suggested Change – Incorporate a table or listing similar to the *draft* preliminary model in Attachment 1, as a framework for coordinating the activities and reporting of the BASMAA agencies. This table is organized according to the main features listed for adaptive implementation on page 69. In addition, if asked to demonstrate load reductions in quantitative terms, BASMAA suggests that storm water programs should have the option to classify actions implemented after the data was collected (as early as the beginning of fiscal year 2001-2002), as "early implementation actions" for the purpose of complying with the urban storm water runoff allocation. (In practice, the feasibility of quantifying load reductions associated with actions implemented during the past two years will depend on the availability of appropriates data.)

- **Infeasibility of diverting flows to POTWs during wet weather flows** – The Implementation Plan for Urban Storm Water Runoff suggests that a portion of storm water during wet weather events could be diverted to Publicly Owned Treatment Works (POTWs) for treatment. However, the load allocations and Implementation Plan for municipal wastewater fails to include receiving these diversions, and past experience indicates that most plants will not accept wet weather runoff.

  Suggested Change – Delete any reference to diverting storm water flows to POTWs or include it in both the Urban Storm Water Runoff and Municipal Wastewater sections of

the Implementation Plan as a possible action if determined to be feasible and cost effective and agreed to by the urban runoff program, POTW, and Regional Board.

- **Adaptive Implementation**

  BASMAA agrees that an adaptive implementation process for the mercury TMDL is an integral part of TMDL process. Reviewing pertinent information collected during the implementation period on a consistent and rigorous timeline is critical to the success of the TMDL process.

  Suggested Changes – We suggest the following revisions be made to the adaptive implementation section of the Report:

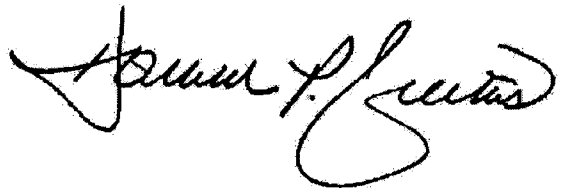
  - Revise the following to include a review of "immediate actions" (i.e., early implementation actions) as part of the 5-year reviews:
    - (p. 69, last sentence) ...to evaluate findings from (immediate) actions, monitoring, special studies ...
    - (p. 70, add to list of focusing questions):
      4. What reductions have been achieved or appear achievable based on evaluation of (immediate) actions? If the reductions / allocations do not appear achievable, how might the Regional Board implementation actions and/or allocations be modified?

- Provide a more complete description and schedule for the planned 5-year reviews, at least during the initial 20-year implementation period. Many of the above comments, if not incorporated in the TMDL report, identify areas that BASMAA considers high priority for inclusion in this schedule.

- Revise the Management Questions - TMDL Targets section (p. 76) to include a paragraph on the need for data to refine or validate sediment targets via studies associated with management question five (food web linkage).

We hope you find these preliminary comments and suggested improvements to the Mercury TMDL Project Report useful. As a next step, we suggest Regional Board staff from the TMDL section and storm water permitting section meet with BASMAA representatives during the preparation of the proposed Basin Plan Amendment and accompanying staff reports to discuss/clarify our concerns. In addition, we would like to work together to incorporate the suggested changes to the TMDL Project Report and implementation plan into a revised TMDL Project Report and proposed Basin Plan Amendment. Please contact me at (925) 313-2373 if you have any questions regarding the comments or suggested changes.

Sincerely,



Donald P. Freitas
BASMAA Executive Board Chair

cc: Arleen Feng, BASMAA Monitoring Committee
Jim Scanlin, ACCWP
Kevin Cullen / Larry Bahr, FSURMP
Bob Davidson, SMCSTOPPP
Jack Betourne, VSFCD
Liz Lewis, MCSTOPPP
Adam Olivieri, SCVURPPP
Bob Oller, SCWA
Chris Sommers, CEP Mercury Work Group
Geoff Brosseau, BASMAA
Tom Mumley, SFBRWQCB
Dyan Whyte, SFBRWQCB
Ron Gervason, SFBRWQCB
Bruce Wolfe, SFBRWQCB
Dale Bowyer, SFBRWQCB
Andy Gunther, Clean Estuary Partnership

Attachment 1:

Draft preliminary table to clarify the proposed NPDES permit requirements for Phase 1 urban runoff programs related to the proposed mercury TMDL targets (##-## = dates to be determined)

Aspect of adaptive implementation plan	Proposed urban runoff program actions	Reporting format and target date
1. Take immediate actions to reduce mercury discharges (i.e., early implementation)	A. Increase recycling of fluorescent bulbs & other products containing mercury, as appropriate (Adopt agency policies, promote outreach, coordinate with HHW, other partners and UWR timeline for full implementation in FY ##-##)	Provide format to report ongoing activities as part of annual reports, starting with reports for FY ##-##
	B. Regionally plan and implement pilot projects designed to evaluate the feasibility and effectiveness of approaches to urban runoff mercury controls (e.g., CEP Urban Runoff Implementation Actions Feasibility Study). Include pilot investigations at sites known to have relatively elevated levels of mercury in sediments (potential "low hanging fruit"). Include other pollutants of concern in studies, as appropriate.	Coordinate planning and design of pilot projects based on findings of feasibility study currently approved by CEP. Start pilot project implementation in FY ##-##
	C. Develop, implement, and/or update a mercury control program	Update existing mercury reduction plans by FY ##-##, thereafter review at 2 year intervals and update if needed and feasible.
2a. Monitor immediate actions	A. Compliance reporting for early implementation actions: o Develop approaches to estimate and report new mercury loads avoided (considering annual rainfall)—coordinate with pilot feasibility studies o Incorporate estimates in annual reports	Develop approach & incorporate estimates into FY ##-## annual reports. Preliminary summary report FY ##-## with 2-3-year average; review 5-year averages and rainfall at 2-3 year intervals.

	B. Analyze pilot implementation studies and recommend modifications or rankings for actions in "toolkit"	Progress report via BASMAA & CEP FY ##-##
2b. Monitor progress towards targets	A. Develop monitoring strategy through regional programs (e.g. CEP/RMP)	Report participation in annual reports
	B. Support monitoring towards targets, coordinated via CEP, RMP or similar stakeholder partnership	Incorporate appropriate activities in program monitoring plans after development of regional consensus on approach
3. Refine and address management questions	A. Participate in regional programs (e.g., CEP and RMP) and support studies on priority management questions (e.g., bioavailability, fate/transport/uptake processes in the Bay, etc.). Support review/evaluation of improved information from studies carried out or tracked through regional programs.	Report participation in annual reports
	B. Coordinate with regional programs (e.g., CEP and RMP) and other stakeholder groups to test and refine assumptions used for source assessment and allocations for urban runoff and related sources (e.g., air deposition, non-urban runoff)	Report participation in annual reports
4. Refine mercury control program through process of adaptive implementation	Incorporate new information into mercury control program gained from: • Pilot implementation studies • Studies focused on priority management questions • Refined conceptual models	Incorporate into mercury reduction plans by FY ##-##, at 5 year intervals thereafter

Alameda Countywide
Clean Water Program

A Consortium of Local Agencies

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BJJ
2003

July 22, 2003

Bill Johnson
Richard Looker
California Regional Water Quality Control Board,
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Re: Mercury in San Francisco Bay
Total Maximum Daily Load (TMDL) Project Report

Dear Bill and Richard:

This letter is submitted on behalf of the Alameda Countywide Clean Water Program (ACCWP) in response to Tom Mumley's June 6th invitation to submit comments and feedback regarding the TMDL Project Report for Mercury in San Francisco Bay (Report).

I first want to commend the two of you, Tom Mumley, other involved Regional Board staff members, the Regional Monitoring Program, the San Francisco Estuary Institute and the Clean Estuary Partnership for all the work that has gone into finalization of this Report. Although we would like to have had more opportunity for input regarding some of the recent changes in the Project Report, we appreciate Board staff's facilitation of the stakeholder process throughout the various stages of Report development. We anticipate and request that this stakeholder process continue through the Basin Plan amendment preparation, adoption and implementation process.

We are mindful of that fact that mercury concentrations in San Francisco Bay fish are high enough to threaten human health and the sport fishing beneficial use of the Bay. In addition, mercury threatens wildlife and rare and endangered species. We recognize that mercury is a persistent, bio-accumulative, toxic metal that does not degrade in the environment. Consequently, we support reasonable efforts to address controllable water quality factors that cause detrimental mercury concentrations in sediment, aquatic organisms, wildlife and humans.

In addition to our support for the efforts necessary to address the controllable water quality factors, we have significant concerns relating to the Project Report as stated in this letter. These concerns are in the nature of constructive comments in anticipation of clarification and possible changes that may contribute to a more accurate and effective Project Report. It is our understanding that the Report and the responsive comments will form the basis of Basin Plan amendments to be acted upon by the Board later in the year. These concerns are in addition to the comments submitted by BASMAA, which we also support.

As you know, a great many scientific uncertainties and unknowns exist with respect to the measurements of source assessment, establishment of numeric targets, linkage between sources and targets, load allocations and effectiveness of implementation actions. In view of these uncertainties, we feel that it is of utmost importance that the goals and targets are flexible enough to allow for appropriate adjustment and modification as more scientific data becomes available and implementation experience develops. Stated differently, while dischargers can and should be held to implementation of various reasonable methods of controllable mercury reduction, numeric results of such methods and actions cannot be assured. We feel strongly that the process (including the implementing Basin Plan amendment) must be flexible enough to allow for such uncertainties and that the specific scenarios suggested in the BASMAA letter should be incorporated into the staff report.

The following comments are directed at three areas of particular concern: (1) uncertainties and unknowns regarding loads from urban stormwater and the relationship between proposed actions and load reductions; (2) the feasibility of some of the proposed implementation actions; and (3) the allocation places a disproportionate level of reduction for urban runoff programs.

(1) Uncertainties regarding loading and proposed reductions

The Report states that local urban runoff contributes 160 kg/yr of mercury to San Francisco Bay. This estimate is based on a very limited dataset of mercury concentrations in bedded sediment in local channels and creeks that was collected for a different purpose and was not meant to be used to develop an estimate of loadings. As the Report states, using the same dataset, BASMAA agencies estimated that the annual loading from local urban runoff was 83 kg/yr. The Report should explicitly state the 95% confidence interval surrounding the 160 kg/yr estimate. It is extremely important the uncertainties surrounding the estimate are clearly stated.

A related issue is the uncertainty regarding the relationship between proposed implementation actions and the proposed 80 kg/yr reduction in urban stormwater loads. The Report provides no indication that there is any link between the proposed implementation actions and the expected load reduction. This linkage needs to be made.

(2) Feasibility of storm water implementation plan

To meet the waste load allocation for urban storm water runoff, the Report provides an Implementation Plan. This plan proposes that storm water dischargers conduct a number of activities including: (1) source control such as promoting the recycling of fluorescent lamps, recycling mercury containing thermometers and other household hazardous waste collection programs; (2) diverting storm water discharges to treatment plants; and (3) treating storm water. Source control programs such as promoting recycling of lamps and thermometers seems reasonable. In fact, the ACCWP has already submitted a Mercury Pollutant Reduction Plan in compliance with Provision C.10.b. of our NPDES permit that takes important steps in this direction. However, diverting flows to treatment plants or treating stormwater to remove mercury may prove infeasible or ineffective.

Diverting Flows: As the Report states, mercury loads from urban runoff are associated with sediment. Since dry weather flows contain almost no sediment and hence, little or no mercury, diverting dry weather flows should not significantly reduce mercury loads. Diverting wet-weather flows appears to be infeasible since treatment plants do not have the capacity to accept large wet-weather flows or sediment-laden flows. If such diversions are to be proposed, which we do not recommend, the acceptance of such diversions should be included in the implementation actions for the wastewater plants.

Treating Stormwater: The Report suggests that the recently adopted stormwater permit requirements related to new development treatment controls should reduce mercury loads. These permit requirements will address new sources but do little to address existing sources except in cases of redevelopment. In addition, the primary methods used to reduce sediment-associated loading are detention basins or wetland treatment systems. In the case of mercury these methods may exacerbate the problem by creating environments that increase mercury methylation.

(3) Disproportionate level of reduction on urban runoff programs

The allocation scheme the Board has proposed places an unfair disproportionate level of reduction on urban storm water dischargers and the Guadalupe River mine remediation relative to other sources. For example, the Report does not propose a waste load allocation for in-Bay dredged material disposal or for local atmospheric sources.

Dredged Material Disposal: The Report states that the average concentration of mercury in dredged material is about 0.37 ppm (p. 25). This is roughly equivalent to the estimated concentration for sediment in urban runoff and about twice as high as the proposed sediment target of 0.2 ppm. The estimated loading from in-Bay disposal is 490 kg/yr (Table 4.5), which is three times as great as the estimated loading from urban runoff. However, the Report seems to indicate that the Regional Board will continue to permit the in-Bay disposal of this contaminated sediment without the imposition of a waste load allocation.

Local Air Sources: The Report estimates that local air sources release 500 kg/yr of mercury (p. 59) and suggests that this source of mercury may be much more bio-available than other sources of mercury (p. 75). However, no allocation is established and no actions are undertaken to reduce local air sources. We suggest that the Board address these local air sources.

It should be noted that atmospheric deposition directly to the Bay is described in the Project Report as "uncontrollable." The Report also notes that of the roughly 180 kg/yr of mercury from storm water (urban and non-urban), as much as 55 kg/yr could result from atmospheric deposition. Thus, a substantial portion of the storm water runoff mercury discharge is from sources deemed by staff to be "uncontrollable." Consequently, source control and other implementation plans can only apply to a maximum of about 2/3rds of the estimated storm water mercury loading. This results in urban storm water programs being required to actually achieve significantly more than a 50% reduction of controllable sources. We suggest that the 55 kg/yr attributable to indirect air deposition be removed from the load allocation for urban storm water runoff and assigned to a separate indirect air deposition source category.

At a meeting on November 19th, BASMAA representatives advocated assigning at least a small nominal reduction to air deposition and non-urban runoff rather than zero reductions, to keep the

door open to engage those sources in future adaptive implementation. If no reduction is assigned to such sources, it will be much more difficult to include them in the future if needed. Some of the proposed implementation activities for urban runoff may also remove mercury currently assigned to atmospheric deposition or non-urban runoff. Thus, we suggest at least small reductions for air deposition and non-urban runoff. ACCWP supports the allocation system proposed in the BASMAA letter. Adoption of the BASMAA approach would mitigate our concerns regarding the Report's proposed allocation scheme.

Adaptive Implementation

The "Adaptive Implementation" section of the Report provides an important framework for potential future changes in the implementation plan, and describes important management questions still remaining. As previously stated, we believe that in view of the many scientific uncertainties and unknowns relating to this TMDL, it is essential that flexibility be specifically built into the Project Report. While the Report states that the plan will be reviewed every 5 years through the Basin Planning process, it is critical for the Basin Plan amendment and Basin Planning process to outline clear scenarios for how continuing studies will address these management questions, how the future stakeholder involvement would be coordinated and how the TMDL direction can be changed if appropriate.

In conclusion, we appreciate the opportunity to submit these comments. As previously stated, while the ACCWP is fully committed to implementing a reasonable control plan for the control of mercury discharges to waters of the San Francisco Bay, achievement of the numeric targets cannot be assured without a flexible process that allows appropriate adjustments based on further scientific information and analysis of the results of effective implementation. This must be built into the Basin Plan amendment at the outset to avoid potential future legal problems relating to backsliding and anti-degradation. Finally, we specifically request that staff meet with our Program representatives and BASMAA members to discuss these issues further prior to circulation of the draft Basin Plan amendment and staff report for formal public comment.

Sincerely,

James Scanlin
Management Committee Chair

Copy: Loretta Barsamian, SFBRWQCB
Tom Mumley, SFBRWQCB
Dale Bowyer, SFBRWQCB
ACCWP Management Committee Representatives (via email)

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CLEAN WATER

SAN FRANCISCO PUBLIC UTILITIES COMMISSION
PLANNING BUREAU
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July 14, 2003

Bill Johnson, Environmental Scientist
Richard Looker, Water Resources Control Engineer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612
by e-mail: bjj@rb2.swrcb.ca.gov; rel@rb2.swrcb.ca.gov

Subject: Mercury TMDL for San Francisco Bay

Dear Messrs. Johnson and Looker:

The San Francisco Public Utilities Commission (SFPUC) appreciates the opportunity to comment on the TMDL Project Report for mercury in San Francisco Bay. We also appreciate the amount and quality of work on this TMDL by the Regional Board, as well as the public outreach efforts.

Our primary concern is that the TMDL correctly describe and incorporate a credit for San Francisco's removal of mercury from stormwater. As you may know, San Francisco has a combined sewer system. This system and associated treatment facilities capture and provide treatment for all of the domestic and industrial wastewater, and virtually all of the stormwater runoff in the City. The recently completed Master Plan under which these facilities were built cost nearly $1.5 billion. Approximately $1 billion of this was needed for the stormwater component of the program. As a result, approximately two thirds of the wet weather flows are treated to secondary treatment standards. The remaining wet weather flows receive either primary treatment or flow-through treatment within the storage transports.

Mercury deposition, and subsequent runoff to the Bay, is a significant source. The San Francisco Estuary Institute report - *San Francisco Bay Atmospheric Deposition Pilot Study* – concluded: "Comparing to other sources and pathways, loading of mercury from atmospheric deposition (combine direct and indirect routes) contributes almost seven (7) times as much as the loading from wastewater discharges." (July 2001)

The result of San Francisco's treatment of stormwater is that an estimated 60% of the solids in the stormwater are removed from the waste stream (measured as total suspended solids). In water, mercury has a strong affinity to particulates, which tends to remove it from the water column to the sediment. If we assume that most of the mercury in the stormwater runoff is associated with particulates, then stormwater treatment should provide major benefits.

Unfortunately, the Report appears to assume that San Francisco is similar to other Bay region urban areas with separate sewer systems providing no treatment. Specifically,

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San Francisco is assumed to have 10.71 percent of the Bay area population and is therefore assigned a stormwater allocation of 8.8 kg/year of mercury. This represents a stormwater load reduction requirement of 8.1 kg/year assigned to San Francisco.

However, San Francisco, at significant costs, provides treatment to stormwater and thereby reduces the loading of mercury to the Bay. We believe the mercury TMDL should take this into account during the allocation process and relieve San Francisco from mercury reduction obligations that are required of urban areas that do not provide comparable treatment to stormwater.

We would also like to point out that San Francisco will continue with its pollution prevention efforts. San Francisco has a very proactive mercury reduction program and was the first in the Bay area to initiate an effort to remove mercury thermometers and control mercury in other products, including paint.

Our second comment concerns compliance issues for point source dischargers. At the meeting, held July 2, the speakers indicated that the Bay would not attain mercury target levels for approximately 120 years. The Clean Water Act regulations require that a TMDL demonstrate compliance with standards before any modifications can be made to water quality-based effluent limits (WQBELs). We request that the TMDL explain clearly how completion of the TMDL will provide relief from the currently proposed final mercury concentration limitations in POTW permits. The operators of many POTWs believe these final limits are not attainable using the existing treatment facilities.

We appreciate your attention to these comments. If you have any questions please do not hesitate to contact me at (415) 934-5787.

Very truly yours,

Michael P. Carlin, Planning Bureau Manager

c.c. Patricia E. Martel, General Manager, SFPUC
Loretta Barsamian, Executive Officer, SFBRWQCB
Craig J. Wilson, Chief, Monitoring and TMDL Listing Unit, SWRCB
William Keaney, Water Pollution Control Bureau Manager, SFPUC
James Salerno, Environmental Services Manager, SFPUC
Arleen Navarret, Senior Supervising Biologist, SFPUC
John Roddy, Deputy City Attorney, City and County of San Francisco

COMMENTS FROM BAY AREA CLEAN WATER AGENCIES (BACWA)

Comments on Mercury in San Francisco Bay, Total Maximum Daily Load (TMDL) Project Report dated June 6, 2003

BACWA commends Regional Board staff in the preparation of a TMDL document which sets forward a workable plan to adaptively manage mercury risk in San Francisco Bay, today and into the future. The plan recognizes current uncertainties and sets forward a long term plan to adjust management activities as additional knowledge is acquired. We support this approach.

BACWA offers the following comment for consideration by Board staff:

1. Editorial comment: The report should be consistent and precise in the statement of our knowledge of mercury problems in San Francisco Bay. For instance, in the summary of key points at the end of section 2, the report states that mercury poses a threat to human health and a threat to wildlife uses due to levels of mercury in fish and bird eggs. We believe this statement is supported by available information and recommend that this language be consistently applied throughout the report. In some locations in the report, the mercury problem is stated as a more definitive fact, implying that direct evidence of mercury poisoning in humans and wildlife exists in the Bay area. We believe these areas should be modified to describe the problem more accurately as a threat or as a potential effect. We believe this characterization does not diminish the need to address the mercury risk and provides ample support for the implementation plan identified in the report.
2. In describing the mercury target values presented in the report, we suggest that some qualification be added to allow reasonable adjustment of these values in the future without sending a message that failure to meet the values leaves the Bay "unprotected". Protection of beneficial uses and management of mercury risk operates over a continuum, where management actions will provide varying degrees of protection or risk reduction. Future information will further clarify the appropriate level of protection required. We should avoid portraying target attainment as a "make or break" proposition at the outset, especially in light of uncertainties regarding mercury risk and our ability to manage mercury to attain the target values.
3. BACWA agrees that additional study is needed to better quantify the relationships between mercury loads, mercury in Bay sediment, methylation and accumulation in aquatic organisms. BACWA believes that further research in these areas is needed to demonstrate the actual relationship between mercury loads and levels in fish. Specifically, we suggest that each source described in the Implementation Plan have parallel language to support studies aimed at better understanding relative bio-availability of different sources, mercury fate and transport, and mercury bio-uptake in San Francisco Bay. This may include investigations of the potential for localized

effects in the vicinity of different sources. These studies should be directly linked to the RMP for future monitoring seasons.

4. While we are supportive of the use of monthly average concentration triggers to evaluate individual plant performance at municipal facilities, we do not believe that maximum daily concentration triggers are necessary. The concern in assessing plant performance is for long-term average conditions and performance, which will be captured through the monthly average concentration triggers. Repeated problems with single day concentrations will produce higher monthly averages. We also suggest that you add re-sampling as a confirmation step when there is a trigger exceedance.

5. Regarding the mercury source control program, as it is described in the Implementation Plan, we strongly suggest that credit be given to those agencies that have shown initiative and achieved significant reductions in potential mercury inputs to the environment. For example, a household hazardous waste facility should be recognized as a valued part of an effective mercury source control program. Agencies that have an effective non-traditional mercury source control approach should be credited in the assessment of triggers or in other significant ways to create an incentive for other agencies to pursue such programs. Such concepts should be addressed as elements of the "Watershed Approach", which should be further refined in the Basin Plan Amendment. We support the notion of purely voluntary watershed approach, and also support efforts to develop a workable program for receipt of credit for proactive activities to reduce mercury risk.

July 11, 2003

Bill Johnson and Richard Looker
SFRWQCB
Via e-mail, bjj@rb2.swrcb.ca.gov, rel@rb2.swrcb.ca.gov

Subject: Mercury in San Francisco Bay TMDL Project Report June 6, 2003

Dear esteemed colleagues,

The Port of Oakland appreciates the opportunity to comment on the mercury TMDL report, which does a fair job of presenting the complexity of this particular contaminant in a dynamic and incompletely understood estuary. While the mass balance model is clearly a work in progress, the Port, as a major dredger, is pleased to see that the effect of dredging and out-of-bay disposal is recognized for what it is - a loss term for mercury and other particle-associated contaminants. Overall, the report is a reasonable first attempt at translating a technically difficult problem into layman's terms and first-step solutions in an adaptive, science-based approach.

This TMDL presents a special case of adaptive implementation in that the response time of the system is expected to be on the order of many decades and, because of this, it is unlikely that monitoring data will provide useful feedback on the effect of management actions on numeric targets during the first several five-year review cycles. Rather, the document expresses a commitment to incorporate research results in future iterations. As a general suggestion, we believe the document would benefit from a closer relationship between conceptual model presentation and descriptions of near-term research goals. In the spirit of steadily advancing the quality of decision-making, we offer the following specific comments.

1. The central assertion in establishing a sediment criterion is not well founded in scientific observation. This key element of the TMDL is the assumed proportional relationship between bay-wide average sediment Hg concentration and bioaccumulation in the food web. While a short paragraph on p. 39 identifies this as an unproven assumption, the reader receives scant reminder of this in the numerous instances (e.g., four pages earlier in the key points of section 5) in which the relationship between sediment concentration and bioaccumulation is stated as fact. It is significant that much the same group of authors cited (p. 38) as USGS 2001c in establishing an empirical relationship between sediment mercury and methylation rate, had this to say about its relationship to bioaccumulation: "**There was no correlation of Hg in fish with total Hg in sediment**" (Brumbaugh et al. 2000, http://webserver.cr.usgs.gov/trace/pubs/setac2000_hg/).

The USGS work cited by Board staff and by us was all done at the water-shed scale, with national coverage of many types of water sheds. Its chief conclusion was that the prevalence of wetlands in a watershed was the single best predictor of Hg methylation. Board staff's "linkage analysis", though it appears reasonable, is not a truly logical set of connections, and may even be wrong. The details of getting from average sediment concentration to any particular biotic tissue concentration appear devilish, probably sort out at a smaller scale than that of an entire watershed, and may turn out to be very site-specific. The mentions of assumptions in the key points of section 6 (p. 41) seem fair enough. We think similar language should appear in the key points of section 5 (p. 35). Moreover, we think the technical sections 3, 4, 5, and 6 would benefit from more explicit references to the research topics listed in section 8. Perhaps these could be given short names and numbered for ease of reference.

2. The report contains other statements that appear to treat empirical relationships, complex models, and simple assumptions all as equivalents. For example, "the proposed... allocations...will result in an average sediment mercury concentration..." (p. 53. ¶ 2), "Therefore, when prey mercury concentrations are cut in half, striped bass mercury concentrations are cut in half" (p. 39, ¶3), are both cases in which the premise or prediction of a model is stated as a firm conclusion. Similarly, the statement," The mercury in exported sediment comes from all over San Francisco Bay" (p. 26, line1) can be read either as the trivial statement that some fraction from each sediment source likely exits the Golden Gate, or as implied in the remainder of this paragraph, that all the sediment in the Bay mixes evenly and then exits the Bay in proportion to the magnitude of its source. The latter interpretation is the box model, not a fact, and is very likely untrue. We are convinced, on reading the entire report, that the authors are well aware of the complexities underlying

these shortcuts in technical writing. Nevertheless, we suggest adding language to indicate that things are not quite so simple. The authors should also define "linkage." The term appears to be used in different ways, with different levels of logical connectedness.

3. The calculated load from bed erosion is probably underestimated. The cited 50% solids is a good number for dredged material from harbors, but 70% (i.e., the 30% "void ratio" typically used in engineering fill calculations) would seem more likely for naturally bedded sediments in central San Pablo Bay. If 70% solids is the better number, then the sediment and mercury loads due to bed erosion (Table 4.1, p. 13) should be increased by about 66% (40% times density difference between sediment and water). The manner of citing Weast and Elert should clarify that they are authorities for the specific gravity estimates, not the calculation.

4. The assumed Hg concentration for dredged material taken out -of-bay (p. 25,¶ 3 and p. 13,Table 4.1) is surely a several-fold underestimate, and therefore the loss term (Table 4.5) is too low. The figure 0.37 ppm may well represent the average of dredged material, but at present, it is mainly the more-contaminated material that is removed from the bay. For example, of the approximately 500,000 cubic yards of material from the Port's –50' Deepening Project that are not suited for wetland cover or in-bay disposal, the average mercury concentration is about 1.6 ppm (Comprehensive Final Sediment Analyses Report, June 1998, by EVS for Port of Oakland), or roughly four times the concentration assumed in this TMDL. Hg concentrations as high as 0.7 ppm are sometimes found in sediment that tests non-toxic and is accepted for ocean disposal. As full implementation of LTMS goals is achieved, some material removed from the bay will become progressively cleaner, but for the near-term, even doubling the loss estimate in Table 4.5 would seem sufficiently conservative.

The Guadalupe River Hg load is probably underestimated (in WY 2002-3, it was roughly 3 times the value stated on p. 20; L. McKee, pers. comm.).

The loss terms in Table 4.5 should have minus signs, because they are in a column labeled "Load."

5. Because of the lack of random sampling in the bay, as well as the uncertainty in the estimated thickness of the active sediment layer, the average Hg concentration in the active layer is not known and may differ substantially from the value used in the mass balance model. The TMDL should acknowledge this uncertainty (or at least refer to the brief mention of ongoing studies in section 8) and list both factors as research priorities. We are pleased to see that the entire approach to mass-balance modeling is scheduled for periodic up dating. A one-box model is only a start and is valid only if the adaptive management process continues to refine the model, test the initial assumptions, and guide research such as the RMP and CEP efforts. Clearly, bay-wide averaging of shear stress, sediment contaminant profiles, and other factors that contribute to loads from bedded sediment, oversimplify what are almost certainly dramatic differences within the Bay, and will not lead to greater understanding of this system.

6. The recognition of spatial separation between inputs and methylation sites, and other complexities of the methylation process as mentioned on p. 37 and in more detail on p. 72, are not portrayed in the simplified drawing in Figure 6.1, although the figure does seem to match up well enough with the method of reaching a sediment Hg target. The true conceptual model, though as yet lacking in quantification, is thus a bit more developed than the one pictured in Figure 6.1, which basically puts all the pathways into a single box. Perhaps you should label this figure the one-box methylation model. Better yet, we encourage combining the water body model and the methylation model into a single model. Without an explicit model relating sediment guidelines to measures of impairment, research priorities will not be well-aimed. For example, the research topics listed on p. 72 address methylation controls in general but do not include specific mention of studies to investigate the relationship between sediment mercury concentration and fish contamination in San Francisco Bay, even though the need to verify this central assumption is mentioned on p. 39.

7. The suggestion in Section 8, p. 68, that dredging "may enhance mercury uptake into the bay food web" appears gratuitous, and the suggested permit condition requiring research of this issue is disproportionate to a first-order consideration of a likely effect. We suggest removing these remarks, or at least putting them into proper perspective. All maintenance dredging is necessitated by constructed features that alter the natural pattern of sediment erosion and deposition. Dredging of contaminated sediment is a special case involving relatively small volumes of material affected by industrial or other local sources of

contamination. All such contaminated material is removed from the bay, for net benefits involving numerous contaminants besides mercury. However, for the most part, maintenance dredging simply removes sediment from artificially deep channels or engineered protected areas, where natural resuspension by wave orbitals does not balance the deposition rate. The approximately 2.5 million cubic yards of sediment that is dredged annually and disposed of in-bay thus represents a trivial fraction of the approximately 100 million cubic yards naturally re-suspended by wind waves (Krone 1979). Moreover, the maintenance of navigation channels may constitute a reduction of bioavailability. The non-equilibrium depth of the maintained channels allows mercury and other contaminants to settle out of the planktonic environment for a year or more between dredging episodes.

Considering the great (> 100%) uncertainties in such basic quantities as river loads, atmospheric deposition, mass balance, erosion rates, sediment active layer, rates and sites of methylation and food-chain transfer, surely a possible 2% increment to bioavailability from dredging activities would be far down any rationally prioritized list of mercury research projects.

8. The dredging community puts nothing into the bay that did not already enter the bay from some other source. Nevertheless, dredgers currently provide support for the Regional Monitoring Program. The Port of Oakland is pleased to see an adaptive implementation program laid out in this TMDL, and we support the goals of the document. We do hope for specific research priorities that move the community toward a rational view of the relative importance of dredging in managing water quality in San Francisco Bay. Therefore, to improve the conceptual model for mercury as well as other sediment-associated contaminants, we suggest adding a specific research goal to improve the quantification of shear stress in the bay. The active sediment layer assumption in the box model (15 cm, page 9) is only OK as a first assumption. In fact, the active sediment layer varies as a function of sediment grain-size, possible armoring by *Potamocorbula*, and shear stress. Shear stress is generated primarily by wind waves and tidal currents. Shear stress can be measured fairly easily, and shear stress due to wave energy can readily be estimated by hindcast techniques. Such efforts need to be part of the adaptive implementation system.

9. The document, though noting the potential difficulty of controlling methylation in created wetlands, and suggesting research in this important area, nevertheless assumes, for the sake of load allocations, full implementation of LTMS. What is missing from the document is a clear indication of the response in adaptive management to the issues posed by proposals to increase wetlands in and around the Bay. If those issues cannot be managed, reuse of dredged material for creating wetlands may prove to be impracticable. On the other hand, if wetland creation goes forward without sufficient controls, and methylation in wetlands is the first order factor in determining fish tissue levels, as suggested by the Brumbaugh study, then the levels of mercury in fish could increase, despite the TMDL effort This issue will arise again, though perhaps with less force, in future TMDLs. We suggest, at a minimum, an acknowledgement of the difficulty and a recommendation that LTMS also be adaptively implemented.

Again, thank you for a job well done and for the opportunity to comment. If you have questions about these comments, please contact Andy Jahn of my staff at (510) 627-1568.

Sincerely,

Jim McGrath
Manager, Environmental Planning

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July 18, 2003

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Messrs. Bill Johnson, Environmental Scientist and
Richard Looker, Water Resources Control Engineer
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

Re: Mercury in San Francisco Bay – TMDL Project Report

Dear Messrs. Johnson and Looker,

The Bay Planning Coalition (BPC) is very pleased to submit comments on the Mercury in San Francisco Bay, TMDL Project Report-- the first TMDL report submitted for public comment, and, therefore, the presumed model for future reports. The development of a TMDL is a very complex scientific and policymaking process, and BPC would like to congratulate the RWQCB on this initial TMDL accomplishment.

Generally speaking, BPC supports the methodology utilized by the RWQCB in the development of the mercury TMDL. Below are some comments on the TMDL approach focused on dredged material which BPC thinks should be applied in future reports.

1) **General accounting of sources and losses**

BPC agrees with your general accounting of sources and losses of mercury in the Bay. Specifically we would like to emphasize our agreement that in-bay dredging and disposal has a net zero loading allocation, and that out-of-bay disposal of dredged material is considered a net loss. We also agree that the natural transport of sediment through the Golden Gate is considered a net loss.

2) **Implementation actions for sediment and dredged material disposal**

The dredging implementation component of the mercury TMDL is based on the subscription to the LTMS 40% ocean-40% upland and beneficial reuse, and-20% in-bay disposal plan. The dredging community diligently works towards achieving the LTMS disposal plan and is making good progress. However, the plan is a disposal **target**, not a regulation. Reaching this target is, in part, dependent on variables beyond the control of dredgers such as a timely permit process and available funding. Thus, TMDL implementation plans should not explicitly require that the dredging community adhere to the 40-40-20-disposal plan because we can only achieve it if it is financially and practically feasible to do so, and that permits are approved.

3) **Proposed new permit requirements in three areas: dredging, NPDES and wetlands projects**

The Mercury TMDL implementation plan proposes the imposition of new requirements on dredging permits, NPDES permits (industrial and urban stormwater dischargers), and wetlands projects. As the TMDL mercury report is the foundation for future Basin Plan amendments and regulations, we are concerned that these requirements are not defined at present and may not be

appropriate. We would like to have further discussions with the Board prior to any adoption of new conditions on permits.

It appears that the general aim is to bring scientific certainty to unknowns about the propagation and impact of mercury or methylmercury throughout the Bay. For example, it is proposed that permits require dredgers to "investigate the degree to which dredging activities may enhance mercury uptake in the bay food web". Permittees are already economically burdened with permit fees, testing requirements, and moreover, permittees contribute to the Regional Monitoring Program (RMP) of the San Francisco Estuary Project. While we understand the need to determine the impact of mercury on Bay health, we recommend that it may be more appropriate that general studies be conducted and funded by established programs such as the RMP.

We have one general comment to be considered when developing future TMDLs. As the Bay and watershed is a dynamic ecosystem, individual TMDL criteria and implementation plans must be developed to ensure that the plans are complementary and provide for adaptive environmental management. We look forward to participating in the TMDL program in the future to ensure the integration of sound science and the balancing of economic and environmental policy goals.

Sincerely yours,

Ellen Joslin Johnck
Executive Director

Cc: LTC Michael McCormick, San Francisco District Engineer, U. S. Army Corps of Engineers
Alexis Strauss, Director, Water Quality Division, U. S. EPA
William Travis, Executive Director, S. F. BCDC
Ms. Celeste Cantu, Executive Officer, State Water Resources Control Board

WaterKeepers

BJJ
JUL 15 2003

July 14, 2003

Via Electronic and U.S. Mail

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Re: June 6, 2003 Project Report on Mercury in San Francisco Bay TMDL

Dear Messrs. Johnson and Looker:

I am writing today on behalf of San Francisco BayKeeper, a project of WaterKeepers Northern California ("BayKeeper"), to offer the following comments on the proposed Total Maximum Daily Load ("TMDL") for Mercury in the San Francisco Bay ("Mercury TMDL"). BayKeeper appreciates the time and energy that Regional Board staff has put into this Mercury TMDL and implementation plan. The document furthers understanding of this difficult problem and takes a stab at resolving some of the challenging technical and political hurdles. However, it continues to raise serious concerns. Like its predecessors, it fails to accomplish the most basic purpose of a TMDL: to set forth a credible plan to cleanup the Bay. The document relies on a fantastically long time frame, fails to allocate loads to specific sources and under the guise of "insufficient authority" or "insufficient information" refuses to regulate some of the most important controllable sources of mercury to the Bay.

There are several aspects of the Mercury TMDL that are not in compliance with the Clean Water Act ("CWA"), and are of great concern to BayKeeper. These include, but are not limited to, the Mercury TMDL's failure to:

- impose a reasonable timeline for implementation,
- assess specific load allocations to individual sources,
- assign loads for aerial deposition.

A. The Implementation Timeline is Far Too Long

BayKeeper strongly opposes the length of the implementation schedule and 120-year recovery timeframe for the mercury problem in San Francisco Bay. This is an unacceptable starting point for planning the Bay's recovery from past and ongoing mercury degradation. Under the proposed schedule no one alive today will live to see this hypothetical recovery. The CWA clearly does not contemplate such incredibly long implementation schedules. *See* 33 USC §1311. A 120-year recovery time frame makes a mockery of Act's articulated goal of creating fishable, swimmable, and navigable waters by 1983. 33 USC §1251(a). We believe more action must be taken now to speed the Bay's recovery. More importantly perhaps, the plan's intention to go more than a century without assimilative capacity exacerbates the Mercury TMDL's other failures and renders them utterly unacceptable.

B. Allocations Must Be Made to Individual Sources, Not Broad Categories

BayKeeper strenuously opposes the categorical allocation approach adopted in the Mercury TMDL. This approach is both illegal and ill-advised. It appears to be a thinly veiled attempt to lay the groundwork for increased mass loadings from some point source dischargers. Such increases should not be permitted until assimilative capacity becomes available.

A maximum daily load must be "established at a level necessary to implement the applicable water quality standards ... ." 33 U.S.C. §1313(d)(1)(C). EPA's implementing regulations require a TMDL to allocate specific loads to individual sources. 40 CFR §130.2 (g) and (h). Specifically, a waste load allocation ("WLA") is "the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution." (Emphasis added). 40 CFR §130.2(h). Similarly, a load allocation is "the portion of a receiving water's loading capacity that is attributed . . . to one of its existing or future nonpoint sources." (Emphasis added). 40 CFR §130.2(h). By allocating loads to categories of sources rather than individual sources, the Mercury TMDL violates the CWA.

Moreover, the categorical WLAs introduce unnecessary confusion into the derivation of effluent limitations. The CWA requires that effluent limits developed for permits be equal to or less than the waste load allocations included in the TMDL. 40 CFR §122.44(d)(4)(vii)(B). The implementing regulations state that "[w]hen developing water quality-based effluent limits, the permitting authority shall ensure that ... [e]ffluent limits developed to protect a narrative water quality criterion ... are consistent with the assumptions and requirements of any available waste load allocations for the discharge prepared by the State and approved by EPA pursuant to 40 CFR §130.7." *Id.* and *EPA*

NPDES Writers' Manual, 1996, at 111. To have any meaning at all, "consistent with" must mean equal to or less than the WLA. The categorical allocations, perhaps intentionally, introduce an obscuring element to these consistency determinations. We strongly urge you to eliminate this unnecessary and confusing component of the TMDL.

In addition, the approach slows implementation by removing incentives for individual performance. The Mercury TMDL interposes a cumbersome group compliance mechanism in place of individual accountability. In an individual allocation scenario, reductions of any single discharger's mercury loadings below his allocation will benefit the Bay. An exceedance of his allocation would subject the discharger to penalty, thereby creating a strong incentive for future compliance. In a group allocation scenario the benefits of good performers could and likely would be swallowed by other dischargers without consequence. The net result will be to prolong ultimate achievement of water quality standards. Individual accountability is a tried and true mechanism for achieving results. BayKeeper requests that each mercury source be made accountable for its own output as required by the CWA. This will ensure the most rapid recovery for the Bay.

Lack of information cannot justify a categorical approach. In some cases (e.g. wastewater discharges) sufficient information clearly exists to carefully divvy up the categorical allocation. In other cases, such as municipal stormwater where existing loads are not sufficiently understood, the implementation plan should set forth how this information will be acquired, the basis for allocating the individual loads once the information is acquired and a deadline for making the individual allocations. *See EPA Memorandum Re: Establishing Total Maximum Daily Load Wasteload Allocations for Storm Water Sources and NPDES Permit Requirements Based on Those WLAs,* November 22, 2003, at 4. In the meantime these sources "should be defined as narrowly as available information allows." *Id.*

C. The Mercury TMDL's Use of 5-Year Averaging is Illegal

The Mercury TMDL implementation plan proposes to determine compliance with the aggregate wastewater loads and the municipal stormwater loads once every five years by comparing the average load over five years to the allocation. Mercury TMDL at 62. This approach is illegal. Section 303 (d)(1) (C) requires calculation and allocation of "daily" loads. The Mercury TMDL's use of 5 year averages to determine compliance attempts to read the word "daily" right out of section 303(d). There is no justification for this approach particularly in the case of the wastewater permit holders.

We believe the CWA requires WLAs to be expressed in NPDES permits as daily mass limitations. If the Board cannot bring itself to follow the law, as a second best

alternative, we urge the Board to express the WLAs with at least as much resolution as the effluent limitations in current permits. In the case of wastewater permits this means monthly and daily concentration limits and / or monthly mass limits. Monitoring should occur at least monthly to determine compliance with the WLA. The report contains no defensible rationale for a five-year compliance review except an apparent desire to go easy on certain classes of dischargers. Unfortunately these are the only classes of dischargers for which the Board has both a clear-cut ability to achieve load reductions and an expressed willingness to regulate the sources.

The use of 5-year averaging combined with the categorical allocation means that individual wastewater dischargers could substantially increase their loadings over several years and not violate the proposed TMDL. Such increases cannot be permitted until assimilative capacity is available. Moreover, by further decoupling individual performance from accountability, the 5-year averaging mechanism will further delay achievement of water quality standards. In light of the vast timeframe for recovery this delay cannot be justified.

D. All "Controllable" Sources Should be Given The Smallest Possible Load Allocations

TMDLs are the CWA's last-ditch strategy for achieving water quality standards. They must be set at "levels necessary to meet applicable water quality standards, accounting for seasonal variations and with a margin of safety to reflect lack of certainty about discharges and water quality." 33 U.S.C. §1313(d). Thus, a TMDL itself must be set at a level that will achieve attainment of the applicable water quality standards immediately.

Certain sources such as bed erosion may be difficult to control and may absorb most or all of the waterway's assimilative capacity. In those situations, the logic of TMDLs requires that the other "controllable" sources share the remainder of the assimilative capacity. If, as is the case here, the difficult to control sources absorb all of the assimilative capacity then the "controllable" sources should receive loads of zero until the assimilative capacity becomes available. According to the report's projections this should be sometime in the next century.

Section 303(d) of the CWA takes neither economic feasibility nor consequence into account. 33 USC 1313(d)(1)(C). This "whatever it takes" principle may seem unfair but it is the law. It simply insists that sufficiently low loads be set to achieve the relevant standard. Section 303(d)(1)(C) requires that states establish a total maximum daily load for those waters that are not meeting water quality standards. "Such load shall be established at a level necessary to implement the applicable water quality standards."

Section 303(d)(1)(c). However, no mention is made of considering the economic feasibility of implementing TMDLs.

Instead of giving allocations of zero or calling for reductions in loading from controllable sources, the Mercury TMDL proposes to maintain aggregate municipal and industrial wastewater loads at current levels and allows for the increase of individual contributions. The Mercury TMDL does not even propose to lock wastewater dischargers into their current performance. In fact recent proposed revisions to wastewater permits suggest that the Board expects to replace performance based "interim" limits with final TMDL based "final" limits. SFRWQCB, Tentative Order for the Fairfield-Suisin Sewer District (NPDES Permit Reissuance), June 26, 2003, at 36; Counties of San Jose and Santa Clara Wastewater Treatment Plant, NPDES Permit No. CA0037842, June 24, 2003, at 11. Neither the permits nor the TMDL make clear how the proposed aggregate categorical loads will be incorporated into the individual permits.

BayKeeper is gravely concerned that subsequent to promulgation of the TMDL the categorical load allocations and the 5-year averaging will be used to rationalize increased mercury effluent limitations in individual wastewater permits. No legally acceptable rationale for allowing such increases exists given the profound absence of assimilative capacity in the Bay. BayKeeper will strenuously oppose any increases in permits and requests that the Mercury TMDL make clear that such increases are not permissible.

The Mercury TMDL's rationale for failing to reduce the loads allocated to controllable sources seems to be that contribution from these sources are small relative to bed erosion, is articulated in the TMDL's explanation of the air deposition load allocation. However, the Mercury TMDL does not present a single concrete implementation step for dealing with bed erosion. Indeed the implementation plan does not even include a section on bed erosion. Staff admitted at the Mercury watershed council meeting that they did not expect to see reductions in this source for 20 to 30 years. The report makes clear that without reductions in the contribution of bed erosion, assimilative capacity will not be available until well into the next century. Until that time controllable sources such as wastewater and storm water should be allocated zero loads and in no event should such sources be allowed to increase their individual contributions.

In particular, the Mercury TMDL should make clear that effluent limits based on the TMDL cannot replace more stringent water quality-based effluent limits ("WQBELs") or performance based limits ("PBELs") currently in permits. A WLA may replace a WQBEL or PBEL only when it is more stringent. The CWA's requirements regarding WQBEL's and PBELs are separate and distinct from the TMDL requirements. 33 USC §1312(a). A WQBEL is required where technology-based limits do not succeed in securing attainment of water quality standards. 33 USC §1311(b)(1)(c), 2(a). Because

San Francisco Bay will not attain water quality standards for mercury until sometime around 2120. Therefore, NPDES permits that allow mercury discharge must contain WQBELs until then. In theory, a TMDL's WLAs should be more stringent than WQBELs and PBELs. However, if the Mercury TMDL is adopted as framed, dischargers may seek to evade the effect of low WQBELs and PBELs that have been calculated for NPDES permits by arguing that they have been displaced by the TMDL's categorical loads. At a minimum, permits should contain the most stringent of an individual WLA, an existing WQBEL or an existing performance based limit. The WLA process should not result in permitting rollbacks while assimilative capacity remains nonexistent.

E. The Mercury TMDL Must Assign Specific Loads and Load Reductions to Local Air Sources

BayKeeper objects to the report's failure to allocate loads to air sources. The Board must allocate loads to all sources. This failure to allocate loads to known sources is a violation of Section 303(d) of the CWA, and 40 CFR §130.2(h). Although some air deposition does come from unknown sources, a substantial portion of aerially deposited mercury comes from local sources, including power plants, which have NPDES permits in addition to Clean Air Act discharge permits. The report's implementation section indicates that between 10 and 59% of the atmospheric mercury in the Bay Area comes from local sources. Mercury TMDL at 60. This suggests a solid opportunity for reducing the air deposition source. Given the dire state of affairs described in the report we cannot afford to pass up any chance to reduce mercury. The excuses offered by staff, infeasibility, lack of information and lack of authority do not hold water.

Without explicitly saying so, the report seems to suggest that calculation of loads for local air sources is infeasible. At the July 2, 2003 Watershed Council meeting, BayKeeper raised its concerns over the lack of regulation of any atmospheric sources, and the alarming fact that no reductions were given to these sources. Staff responded that at this time, in their opinion insufficient information exists to allocate loads to air sources. This proposition is clearly false. Local sources of atmospheric mercury contamination are clearly understood, are heavily regulated by a sister agency, and are regularly monitored. For example, Board Staff's April 1, 2003 memo regarding air sources of mercury deposition makes clear that staff has calculated the mass of mercury in crude oil processed by Bay Area refineries to be 382 kg mercury/year. The only area of uncertainty seems to involve translating a particular air contribution into a mass load for the Bay. This uncertainty does not excuse the Board from establishing an allocation. In fact to the contrary, the lack of information suggests that very stringent loads should be allocated to these sources in order to provide the legally required margin of safety in the allocation. 33 USC §1313(d)(1)(C).

The Mercury TMDL concludes without analysis that "load reductions for atmospheric deposition do not appear feasible,"[1] and therefore does not assign any reduction to air sources.[2] All the evidence suggests that local air sources are a significant a source of mercury to the Bay. All the available evidence suggests that reductions in local sources would benefit the Bay and increase the speed of its recovery. The report does contain some discussion of the cement industry and suggests that some technologies may not be "cost effective" for the cement industry. Mercury TMDL at 60. The CWA does not permit the Board to delay achievement of WQS under a TMDL on the grounds of cost or other economic factors. 33 USC §1313(d)(1)(C). Consequently loads should be allocated to sources such as cement manufacturers despite the costs that will be imposed.

The report suggests that local air sources are not included as part of the Mercury TMDL because the Board does not have jurisdiction to allocate loads to air sources that have permits under the CAA, rather than the CWA. Mercury TMDL at 45. BayKeeper is not aware of any authority for this proposition. To the contrary, the Regional Board's position as the entity delegated authority to issue CWA permit suggests otherwise. The Clean Water Act and its implementing regulation impose a clear and unambiguous obligation on the State of California to allocate loads to all sources. 33 USC §1313(d)(1)(C), 40 CFR §130.2(g) and (h). As the state agency responsible for implementing the state's Mercury TMDL in the Bay, the Board derives its authority directly from section 303(d) of the CWA. Any state laws to the contrary are preempted by the federal statute. If the Regional Board believes it lacks the authority to carry out a legally sufficient TMDL it should relinquish the TMDL to another state agency that has the power and will to fulfill the CWA's mandates.

F. The Mercury TMDL does not Adequately Address how Allocations to Other Watersheds will be Enforced

One of the largest flaws in the proposed TMDL is the failure to adequately address Central Valley sources. Until allocations to individual sources in the Central Valley are complete, the Mercury TMDL for the Bay remains incomplete, as both a legal and practical matter. The real possibility remains that the future regulatory process in the Central Valley will come to a different total load than the 330 kg/year provided for under this process. If this happens the TMDL equation for mercury in the Bay will be ruined. If the Central Valley Water Board establishes a dramatically higher TMDL for the Delta all other loads in the Bay will require adjustment. Consequently, BayKeeper does not

[1] Mercury TMDL at 59.
[2] On page 45 the Mercury TMDL states, "The load allocation is the same as the current 27 kg/yr load. This allocation is based on the assumption that atmospheric deposition is uncontrollable."

support amendments to the Bay's Basin Plan until this critical question is settled. The Central Valley Basin Plan must be amended at the same time as the Bay's plan to assure a consistent and complete TMDL for the Bay.

As an alternative, BayKeeper would support this Board's allocation of loads outside this region. Staff believes that the Board does not have jurisdiction to regulate or assign individual loads in this manner. BayKeeper believes the usual jurisdiction limitations on the Board are trumped for TMDL processes by federal preemption under the CWA. Moreover, even if the Board's jurisdiction is limited, it can do more to advance solutions to the problem. The Board can petition the State Board to accelerate development of the Central Valley component of the TMDL, and begin the analyses necessary to complete that portion of the TMDL in order to give the Central Valley Board a head start.

With regard to the Guadalupe TMDL, this Board does have jurisdiction. Although the Board has established a separate administrative process to deal with the Guadalupe watershed, the load allocations in that watershed are in actuality a legally required part of this TMDL. Without allocations to all those sources the Bay TMDL is legally incomplete. BayKeeper will not support Basin Plan amendments unless they are done contemporaneously and consistent with the amendments implementing the portion of the mercury TMDL in the Guadalupe watershed.

G. The Target Mercury Level for Bird Eggs will Harm Endangered Species

The proposed numeric target for bird eggs of 0.5 parts per million ("ppm") represents the lowest observable adverse effect of mercury concentration. However, as Daniel Russell from the USFWS pointed out, this target will not adequately protect the reproductive capacity of some bird species, including the endangered California clapper rail. The bird egg target should be changed from lowest observable adverse effects to no observable adverse effects to ensure that vulnerable species such as the clapper rail are not harmed.

H. All Language Regarding Mercury Trading Should be Removed

Any reference in the Mercury TMDL to trading programs is premature and should be removed. On page 65 the Mercury TMDL discusses, briefly, the possibility of trading pollution credits. The stakeholder process is discussing the possibility and logistics of a trading program, but unless that process is successfully completed, discussion of a trading program in the Mercury TMDL will only confuse dischargers and make accurate planning impossible. While BayKeeper is open to the possibility of a well-orchestrated mercury trading policy, the few sentences included in the plan are not adequate and

should be removed so that permit holders will not unwisely plan their future discharges based on the fact that trading may be possible at some point.

For the forgoing reasons, BayKeeper urges the Board to: (1) include measures that will substantially shorten the time line for attainment of WQS; (2) allocate WLAs to individual sources, specifically wastewater permits, stormwater permits and local air sources; (2) include assurances that effluent limitations will be consistent with WLAs, but not displace existing limitations that are more stringent and; (4) remove all language about the potential trading program that is unclear.

Sincerely,

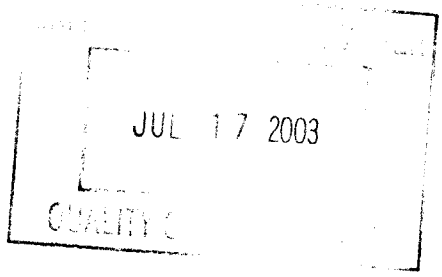
Leo O'Brien
Executive Director
WaterKeepers Northern California

NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

July 14, 2003

VIA FACSIMILE and U.S. Mail



Bill Johnson
Richard Looker
Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, California 94612
Fax: (510) 622-2460

Re: Draft Total Maximum Daily Loads for Mercury in San Francisco Bay

Dear Messrs Johnson and Looker:

On behalf of the Natural Resources Defense Council ("NRDC"), we submit the following comments on the June 6, 2003 Draft Total Maximum Daily Load for Mercury in San Francisco Bay ("Draft TMDL"). We appreciate the opportunity to provide comments on this early Draft TMDL.

As a general matter, we are greatly concerned that this Draft TMDL fails to include a meaningful implementation schedule. Specifically, despite the discussion of the harmful effects of mercury on wildlife and humans, the Draft TMDL fails to adequately appreciate these effects, given the 120-year recovery timeframe and implementation plan. Further, the 120-year recovery timeframe and implementation plan for meeting the Clean Water Act requirement of attaining water quality standards to protect beneficial uses is not only an unreasonable time frame, but contravenes the spirit of the Clean Water Act.

A. Impacts of Mercury Pollution

As discussed in the Draft TMDL, mercury pollution in the San Francisco Bay comes from a combination of sources, including, among other things, historical mining activity in the watershed, ongoing discharge of mercury from combustion and landfilling of mercury-containing material, and urban stormwater runoff. Microorganisms in the sediments methylate this mercury; unlike metallic or inorganic mercury, methyl mercury is readily absorbed in the gastrointestinal tract of organisms including humans. More than 95% of an ingested dose of methyl mercury is absorbed within 24 hours and distributed throughout the body, but particularly to muscle and brain. Excretion of methyl mercury from living organisms is quite slow. In the

human, the half-life of methyl mercury in the body is approximately 60 days, meaning that regular fish consumption can result in significant accumulation.

The EPA Reference Dose (RfD) for mercury, derived in 2001 and set at 0.1 micrograms/kg/day, is designed to set a health-protective level of exposure for humans, yet the data show that current exposure levels in the population are quite high in comparison to this level.[1] The Centers for Disease Control and Prevention reports that 8% of women in the U.S. have levels of mercury in their bodies that exceed the EPA (RfD).[2] In the Bay Area, one recent study found that 89% of high-end fish consumers had blood levels of methyl mercury in excess of the EPA RfD.[3]

Symptoms of moderate methyl mercury poisoning in the adult may include behavioral changes, memory loss, headaches, sleep disturbances, hair loss, tremors, numbness and tingling of the fingers, toes, and lips, and constriction of visual fields ("tunnel vision"). These symptoms have been reported in adults who regularly eat large predator ocean fish (such as shark or swordfish), or contaminated fish from areas such as the San Francisco Bay. Recent data from several large cohort studies indicate that mercury may increase the risk of cardiovascular disease.[4] Adult males with higher levels of mercury in their bodies may have double the risk of myocardial infarction (heart attack) compared to their peers with lower mercury levels. Researchers have concluded that mercury may seriously detract from the beneficial cardiac effects of omega-3 fatty acids from fish.[5]

The most significant health effects of methyl mercury are on the developing fetus and infant. Because methyl mercury arrests cell division in the brain and interferes with the microtubules in axons that transmit nerve impulses, this substance exhibits significant developmental effects. Infants born to women who ingested large amounts of fish contaminated with methyl mercury exhibited mental retardation, ataxia, blindness, and cerebral palsy.[6] Modest consumption of methyl mercury-contaminated fish has been shown to cause subtle neurological effects that persist in children during

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[1] Rice DC, Schoeny R, Mahaffey K. Methods and rationale for derivation of a reference dose for methylmercury by the U.S. EPA. Risk Anal 23(1):107-15, 2003.

[2] Schober SE, Sinks TH, Jones RL, Bolger PM, McDowell M, Osterloh J, et al. Blood mercury levels in US children and women of childbearing age, 1999-2000. JAMA. 289(13):1667-74, 2003.

[3] Hightower JM, Moore D. Mercury levels in high-end consumers of fish. Environ Health Perspect. 111(4):604-8, 2003.

[4] Salonen JT, Seppanen K, Nyyssonen K, Korpela H, Kauhanen J, Kantola M, et al. Intake of mercury from fish, lipid peroxidation, and the risk of myocardial infarction and coronary, cardiovascular, and any death in eastern Finnish men. Circulation.91(3):645-55, 1995.

[5] Guallar E, Sanz-Gallardo MI, van't Veer P, Bode P, Aro A, Gomez-Aracena J, et al. Mercury, fish oils, and the risk of myocardial infarction. N Engl J Med. 347(22):1747-54, 2002.

[6] Myers GJ, Davidson PW. Prenatal mercury exposure and children: Neurologic, developmental, and behavioral research. Environ Health Perspect 106(Suppl 3): 841-847, 1998.

their years in school, including deficits in learning, memory, and concentration.[7] These serious and chronic health effects, at levels of exposure near or at the levels occurring today in many fish-eating groups, create an urgency that requires dramatic steps to clean up the San Francisco Bay. Therefore, this urgency justifies a much quicker and effective implementation plan and recovery time frame than the 120 years proposed in the Draft TMDL.

B. The Method of Waste Load Allocation Sacrifices Water Quality

The basic tenet of the Clean Water Act TMDL program is to attain and maintain water quality standards. Pursuant to section 303(d) of the Clean Water Act, TMDLs must be established for water bodies and pollutants that are not meeting water quality standards. TMDLs must be set at "levels necessary to meet applicable water quality standards, accounting for seasonal variations and with a margin of safety to reflect lack of certainty about discharges and water quality." 33 U.S.C. §1313(d). Thus, the TMDL itself must be set at a level that will achieve attainment of all applicable water quality standards. We do not believe that this has been accomplished in the Draft TMDL in terms of the load allocations.

In this connection, the Draft TMDL fails to adequately include a margin of safety. 40 C.F.R. 130.7(c)(1). A margin of safety must ensure that the TMDL is fully protective of water quality in the face of uncertainties inherent in the available data or the modeling techniques. *Id.* While the Draft TMDL purports to contain a margin of safety, the margin of safety does not fulfill the true function of a margin of safety as currently drafted.

We understand the Draft TMDL's calculation of an overall fifty percent load reduction based on San Francisco Bay's assimilative capacity for mercury. Draft TMDL at 49-50. However, it is unclear why the TMDL applies only a fifty percent reduction for urban stormwater runoff loads considering that greater reductions are possible. Similarly, it is unclear why no reduction in loads is required for wastewater loads. The Draft TMDL does not explain why the 17 kg/yr load for municipal discharges and 2.1 kg/yr load for industrial dischargers, including refineries, cannot be reduced, notwithstanding the monitoring and study requirements. Given the lengthy recovery timeframe, the load reductions must be adjusted to result in the lowest amount of mercury discharge as possible. *See Alaska Center for the Environment v. Reilly*, 762 F. Supp. 1422, 1429 n.8 (W.D. Wash. 1991); *aff'd Alaska Center for the Environment v. Browner*, 20 F.3d 981 (9th Cir. 1994) (emphasizing the importance of timely promulgation of TMDLs, even in the face of inadequate data).

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[7] Grandjean P, White RF, Weihe P, Jorgensen PJ. Neurotoxic risk caused by stable and variable exposure to methylmercury from seafood. Ambul Pediatr. 3(1):18-23, 2003.

C. The 120-Year Implementation Schedule Is Too Long

We strongly oppose the length of the implementation schedule and 120-year recovery timeframe for the mercury in San Francisco Bay. The Clean Water Act consistently requires that water quality standards and effluent limitations be met within a short period after promulgation.[8] Further, federal courts have consistently held that Congress intended TMDLs to be complete decades ago.[9] Moreover, the Clean Water Act established a national goal to meet fishable, swimmable, and navigable water quality standards by 1983.[10] Thus, the Clean Water Act requires speedy implementation of regulations to attain water quality standards. Therefore, the provision of 120 years for compliance with the TMDL is contrary to the spirit and letter of the Clean Water Act.

Similarly, the State Water Resources Control Board ("State Board") prohibits such long implementation schedules for toxics, such as mercury. *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (2000) ("SIP"). Although the SIP allows longer implementation schedules for waters regulated by TMDLs, it in no way sanctions a 120-year recovery timeframe. SIP at 3. Specifically, the SIP allows only "up to **five years** to comply with a TMDL-derived-effluent limitation." SIP at 20 (emphasis added) (allowing a total of 15 years for TMDL regulated waters). Thus, the 120-year recovery timeframe clearly violates the SIP.

In this connection, we oppose the 20-year implementation schedule for a fifty percent reduction for stormwater loads and Guadalupe River watershed loads. As discussed above, this 20-year implementation schedule for these loads violates the SIP's five-year implementation directive. Thus, the Draft TMDL must be modified to require the loads for stormwater and the Guadalupe River to be implemented within five years, if not sooner. *See* SIP at 20.

Importantly, the implementation schedule ignores the largest sources of mercury: Central Valley watershed (31%) and bed erosion (32%). The Draft TMDL merely suggests that the San Francisco Regional Water Quality Control Board ("Regional Board") will work with the Central Valley Regional Board to reduce loadings from the Central Valley while noting that the Central Valley watershed is beyond the jurisdiction of the Regional Board. Draft TMDL at 16, 55. Considering the magnitude and persistence of the mercury problem, the Regional Board must do more. Action greater

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[8] *See e.g.*, 33 U.S.C. § 1301(b) (setting forth 3-year timetable).

[9] *Alaska Center for the Environment v. Reilly*, 762 F. Supp. 1422, 1429 n.8 (W.D. Wash. 1991); *aff'd Alaska Center for the Environment v. Browner*, 20 F.3d 981 (9th Cir. 1994) (emphasizing the importance of timely promulgation of TMDLs, even in the face of inadequate data); *Sierra Club v. Hankinson*, 939 F. Supp. 865, 871 N.D. Ga. 1996).

[10] 33 U.S.C. § 1251(a).

than cooperation is needed in light of the significant delays in addressing the mercury problem for water bodies in the Central Valley Watershed. In fact, the Sacramento River, a primary Central Valley river, was listed as impaired for mercury on the 1998 303(d) list with a proposed TMDL completion date of December 2005 and assigned a high priority ranking.[11] However, the 2002 303(d) list eliminated the completion date for the mercury TMDL and gave the TMDL a medium priority ranking.[12] Because of the stall in mercury TMDL development in the Central Valley region, greater commitment is required. For instance, this Regional Board could enter an agreement with the Central Valley Regional Board for timely development of a mercury TMDL, including funding and technical support. Alternatively, the Regional Board could petition the State Board to order timely development of the mercury TMDL for the Central Valley.

The Draft TMDL's implementation plan also fails to consider meaningful means of reducing mercury loads from bed erosion. Although the Draft TMDL discusses sediment dredging and disposal, it fails to present any dredging requirements in the future. Nor is there discussion of removing mercury-laden sediment for tributaries or moving soil such as hot-spot remediation or settling-basin construction.

In sum, we appreciate the Regional Board's recognition of the serious mercury problem in San Francisco Bay by developing a TMDL. However, adopting an implementation schedule that attains water quality standards to protected beneficial uses in 120 years fails to effectively address this serious pollution problem. We urge the Regional Board to revise and shorten the implementation schedule so as to develop a meaningful TMDL in the next Draft TMDL.

Again, we appreciate the opportunity to comment on the Draft TMDL and look forward to providing comments on the next draft of the mercury TMDL. Should you have any questions regarding these comments, please feel free to call.

Sincerely,

David S. Beckman
Anjali Jaiswal

Dr. Gina Solomon / WB
Dr. Gina Solomon

[11] *See* 1998 California 303(d) List and TMDL Priority Schedule, Central Valley Regional Water Quality Control Board, available at http://www.swrcb.ca.gov/tmdl/docs/303dtmdl_98reg5.pdf (last visited July 11, 2003).

[12] *See* 2002 CWA Section 303(d) List of Water Quality Limited Segment, available at http://www.swrcb.ca.gov/tmdl/docs/2002_cwa_section_303d_list_wqls_020403.pdf (last visited July 11, 2003).

July 14, 2003

Lorreta Barsamian, Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
1515 Clay Street, Oakland, CA
via email

Re: Mercury TMDL Report

Dear Lorretta Barsamian:

Clean Water Fund (CWF), a national 501(c)3 nonprofit organization operating in California, appreciates this opportunity to comment on the San Francisco Regional Water Quality Control Board's *Mercury in San Francisco Bay Total Maximum Daily Load (TMDL) Project Report*, released June 6, 2003. The *Mercury TMDL* presents a unique opportunity to act to reduce the San Francisco Bay mercury load and bring lasting improvements to the health of our region.

CWF staff has wide-ranging experience with TMDL processes, both in the San Francisco Bay region and nationally. With respect to development of Region 2 mercury TMDLs, we are active participants in the Mercury Council convened by the Regional Board, and in the Technical Work Group of the Guadalupe River Watershed Mercury TMDL, convened under the auspices of the Santa Clara Basin Watershed Management Initiative. Our comments are directed at strengthening the proposed Mercury TMDL for the San Francisco Bay region, in order to achieve a broad consensus among community stakeholders and public agencies on necessary actions to achieve water quality objectives and full beneficial uses of the San Francisco Bay. They are organized under thematic headings and contain references to the *Mercury TMDL Report*.

Health Protection

The Report accurately states the continuing threat of mercury contamination of the San Francisco Bay to human health and the survival of rare and endangered species living in the estuary. Although this threat is urgent, the Regional Water Board's proposed plan to address mercury contamination in the bay would take at least 120 years to return the bay to a healthy, protective state:

To address mercury in the bay, the Regional Board's Mercury Total Maximum Daily Load (TMDL) Implementation Plan proposes to reduce the concentration of mercury in fish tissue by about 40% to 0.2 parts per million (ppm). To protect wildlife and rare and endangered species, the concentration of mercury in bird eggs would be reduced by about 50% to 0.5 ppm. To reach these targets, the Regional Board Report proposes load allocations from major mercury sources. 'By implementing the proposed allocations, the average sediment mercury concentration in the bay will likely drop from about 0.44 ppm to about 0.15 ppm, reaching the target of 0.2 ppm after at least 120 years.' (p. 50).

Clean Water Action believes state regulators should adopt a more aggressive timetable and demand stronger actions to reverse the bay's heavy load of mercury. 120 years is too long to wait for effective action to protect the health of the region.

Numeric Targets and Antidegradation

The numeric targets in fish tissue and bird eggs are not sufficiently protective and therefore are not consistent with antidegradation policies intended to protect water quality and beneficial uses (Section 131.12 of Title 40 of the Code of Federal Regulations).

"To be consistent with the antidegradation policies," the Report states, "these targets, taken together, cannot be less stringent than the existing water quality objectives. The proposed combination of the numeric targets is as protective as the objectives. Since mercury concentrations already exceed the bioaccumulation objective, meeting the numeric targets would improve current water quality conditions. Therefore, the proposed targets are consistent with the antidegradation policies and the protection of water quality and beneficial uses." (p. 35).

Yet we find that the Report is inconsistent on establishment of a numeric target for bird eggs, as the following passages selected from the Report show:

"In a ring-necked pheasant feeding study, egg mercury concentrations between 0.5 and 1.5 ppm significantly reduced hatching success (Fimreite 1971)." (p. 31)

"The 99 th percentile is appropriate for comparison to the target because adverse effects are associated with mercury concentrations of 0.5 ppm. Therefore, very few or no eggs should have a mercury concentration higher than the bird egg target concentration." (p. 71)

"Based on currently available information, bird eggs represent the most sensitive wildlife endpoint, and bird eggs are distinctly more prone to hatch failure at a certain threshold level (approximately 0.5 ppm)." (p. 76).

Granting the appropriateness of use of the 99 th percentile for comparison to the proposed target, a numeric target can not be selected if it is associated with known "adverse effects" which "significantly reduced hatching success."

Margin of Safety

The proposed numeric bird egg target also fails to consider a margin of safety required by Clean Water Act section 303(d)(1)(C), as promulgated in U.S. EPA's Final TMDL Rule:

EPA believes that the margin of safety required by the section 303(d)(1)(C) for establishment of TMDLs allows for consideration of more factors than the scientific uncertainty included in the development of water quality standards and must also account for analytical uncertainties associated with all the calculations required to establish a TMDL.

EPA has clarified this requirement at § 130.32(b)(8) in the final rule by explicitly stating that the margin of safety must appropriately account for uncertainty, including those associated with pollutant loads, water quality modeling, and monitoring. Federal Register, July 13, 2000, Vol. 65, No. 135, pp. 43624.

Mercury Methylation

Mercury methylation presents another area where scientific uncertainty should direct selection of a more protective numeric target for bird eggs. According to the Report,

"factors relating to mercury methylation and accumulation within the food web are complex and not fully understood. In the absence of additional information, reductions in mercury loads are assumed, for purposes of this report, to result in proportional reductions in fish tissue residues."

Yet the Report presents additional information on the risk of mercury exposure of the endangered California clapper rail that places in question this proportional reduction hypothesis:

"The mercury exposure of birds that catch prey throughout the bay likely reflects overall bay conditions. Birds, such as the endangered California clapper rail, that eat organisms from the bay floor often forage in sediment where methylmercury production may be high. California clapper rails are non-migratory, spending their entire lives in marshes. During the breeding season, they have a range of only a few acres and rarely move between marshes. As a result, their eggs reflect local methylmercury production" (Davis et al., in press). (p. 39).

"Additional study is needed to quantify the relationship between the aquatic food web and bird eggs. Available information does not fully explore exposure (e.g., diet), mercury transfer to eggs, and the relationship between mercury levels in eggs and reproduction. In the absence of additional information, however, reductions in bird egg concentrations are assumed, for purposes of this report, to be proportional to reductions in fish tissue mercury. Reducing mercury loads will reduce bird egg mercury concentrations." (p. 40).

Assimilative Capacity

These uncertainties and the absence of a protective numeric target for bird eggs call into question the key Report finding on the bay's assimilative capacity:

Assuming that the amount of mercury in San Francisco Bay needs to be reduced by about 50% to meet the proposed targets, the assimilative capacity of the bay is about 32,000 kilograms. (p. 41).

Normalization of Sediment Concentrations

According to the Report, the Central Valley mercury load is about 440 kg/yr, with an uncertainty of ±100 kg/yr (SFEI 2002a), representing about 36% of the bay's total mercury sources. This report uses sediment mercury concentration data not normalized to percent fines (primarily silt and clay particles less than 62.5 microns), arguing that normalization could overstate mercury concentrations in urban runoff management runoff if the particle size distribution of the sampled sediment is more like that of total sediment than suspended sediment. However, because the finer particles typically contain more mercury, normalization is commonly done. Clean Water believes normalization should be performed on sediment mercury concentration data and the results compared with the non-normalized data set, to establish an alternative range for urban and non-urban areas.

Atmospheric Deposition

The Report gives reason to be concerned about ongoing point sources of mercury, stating that

> Some recent mercury experiments suggest that mercury newly deposited in the environment is more readily methylated than existing mercury already in the system (Benoit et al. 2003). This suggests that, although most of the mercury in San Francisco Bay results from historical sources (Dorrance 2002; USGS 2000), recent mercury additions may be proportionally more responsible for human and wildlife mercury exposure (USGS 2003). (p. 42)

yet neglects to incorporate these concerns when allocating loads to polluters. No reduction in atmospheric deposition loads is proposed. The proposed atmospheric deposition allocation would leave this source at the status quo of about 27 kg/yr.

Combustion sources, such as power plants and cement factories, contribute potentially more lethal loads. Although the Report concluded that atmospheric deposition of mercury on the bay surface is estimated to be 27 kg/yr, consideration of the error factor of "two to five fold" (SFEI 2001b) coupled with a finding that methyl mercury production occurs at higher rates among such deposits and poses greater risk to non-migratory endangered species leads us to conclude that atmospheric sources merit significantly more conservative allocations to such heavy industrial sources.

Clean Water Fund believes adoption of source material substitution strategies and best management practices at facilities emitting mercury to our region's air could materially contribute to meeting regional TMDL objectives. Clean Water Fund supports a pollution reduction hierarchy that focuses on pollution prevention and the removal of mercury from primary pollution sources.

Mining Sources

The Central Valley's proposed allocation fails to ensure proportionate progress is made in that region. The San Francisco Region is unique in the state as being the sole region that drains, and therefore receives much of the burden of water pollution loads that find their origin in, another region. Under the proposed allocation plan, the mercury load that is a legacy of mercury mining in the Guadalupe River watershed will be reduced to about 2 kilograms over the next 20 years, as opposed to the 92 kilograms/year the Guadalupe watershed currently contributes to the bay. This shows that Regional Board staff believes action against major sources of mercury can be taken in the near term that would bring significant improvements expected within a generation. Proportionate reductions should be ordered for similar mining sources in neighboring regional watersheds.

We believe the San Francisco Regional Board should set stricter and specific allocations for reducing the load of imported mercury laden sediments from the Delta/Central Valley. The SF Regional Board should coordinate with Central Valley Regional Board on clean up of the New Idria and other mine sites that continue to contribute to the bay's mercury problem.

Clean Water Fund welcomes future opportunities to meet with you and your staff to discuss our concerns about the proposed Mercury TMDL. We are currently in the

process of moving our offices. Please do not hesitate to contact me at our new office address: 111 New Montgomery, Suite 600, San Francisco, 94105 (after August 1), or at your convenience by e-mail: msjones@cleanwater.org.

Sincerely,

[signed]

Michael Stanley-Jones
California Director, Clean Water Fund

cc: Richard Looker, SF RWQCB
Trish Mulvey, CLEAN South Bay

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BJJ
JUL 10 2003

9 July 2003

Bill Johnson and Richard Looker
Environmental Scientist
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
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RE: Comments on San Francisco Bay Mercury TMDL Project Report

These comments should be considered as peer review scientific inputs of several SFEI staff scientists, but not as a formal policy of SFEI. In general, we found the report to provide a good overview of the available information about mercury sources, fate, and effects. We also believe that the proposed implementation strategy is well-balanced. However, there are a number of assumptions in the report that fall somewhere in the gray area between science and policy, and could have significiant ramifications in future TMDLs. We believe they warrant further consideration.

Means or Medians

The report alternates between reporting loads as the mean of a number of estimates and environmental targets below which median concentrations should fall. The dilemma is that most environmental attributes are log-normally distributed and the central tendency of the distribution is best described by the median, while the total amount of the material is best described by the mean. You should consider using the same methods to characterize the average loadings data and the average amounts in water and sediments. Given that the cumulative exposure of a human or wildlife consumer (the primary management concern) fishing/foraging randomly throughout the bay would be more characteristic of the mean rather than the median, we suggest that the mean be used for both evaluation of loads and achievement of concentration targets.

The Meaning of Assimilative Capacity and the Mixed Layer

The report states an assimilative capacity for the total Bay system based on the amount contained in a sediment compartment assumed to be 15.0 cm deep. You have a couple different alternatives that you should evaluate—none of these alternatives is perfect, but they have slightly different policy and educational ramifications:

- The amount of mercury in surface sediments amenable to methylation (earlier stated as 5 cm). Although the penetration depth of the oxic zone at any given time or location (snapshot) may be only 5 cm, periodic deeper mixing would mean that the entire volume is "in play". Defining the surface sediments as 5 cm means you have to calculate a term for mixing input of Hg from deeper sediments into the surface box, which could be difficult.

- The volume of water in the Bay multiplied by the water quality standard, since the water quality standard is the aim of the Basin Plan [this is similar to the approach of the Cu/Ni conceptual model, which looks primarily at the water column compartment and considers sediment resuspension as an "external input" of a sort. Since Hg and other contaminant water column concentrations are so driven by episodic sediment supply and resuspension, again you have the problem of discerning achievement (or lack of achievement) of targets from the natural variability in measurements of the system. The analysis described implicitly acknowledges this (e.g. their 4 day modeled average suspended sediment concentration multiplied by an assumed sediment Hg concentration).
- A loading rate rather than a static amount based on the above alternatives and a flushing rate.

Effectiveness of Linkage Assumptions
Figure 4.2 suggests that mercury loads to the Bay have declined by a factor of two from a peak, presumably just prior to the implementation of the Clean Water Act. Yet, the fish data from that time (RMP 2000 Fish Report, in press) to the present do not show much evidence of a decline. This issue is significant since the TMDL calls for a reduction of sediment concentrations by a factor of two.

Conservatism
The cumulative impacts of conservatism at several layers potentially yields a very conservative estimate. Has there been a policy assessment of how much conservatism is sufficient? Implicit in such a calculation would be a population size and an associated probability and degree of impact that would be considered acceptable. On the other hand, for the wildlife target, the goal of "no detrimental increase in mercury concentrations in San Francisco Bay bird eggs" may not be sufficiently conservative if interpreted as "no significant change in concentrations". For example if concentrations are already high enough to have negative impacts 90% of the time, changes to 100% impacts may not be statistically significant. Removal of "increase in" would be more conservative.

Human Health Goals
For the most part, the TMDL goal is driven by the protection of subsistence fishers. For the Bay Area as a whole, national food basket studies suggest that most of the mercury intake is from market sources, particularly tuna. There are published data suggesting that Marin County sushi eaters have significant mercury contamination that is affecting their health. In order to verify a significant health benefit to subsistence fishers, it would be important to collect mercury concentration data from subsistence fishers. The analyses are non-intrusive (hair samples), and relatively cheap.

Balancing Priorities
The TMDL states that "If wetlands are being restored and come under Regional Board jurisdiction, the plan is to require a demonstration that the project does not result in a net increase in the production of methylmercury. " If a wetland project increases wildlife biomass/population/productivity but results in concentrations similar to or less than existing conditions at similar locations (total methylmercury mass is the Bay ecosystem is

increased but concentration unchanged), is this considered a net increase in production? It would seem that such an increase in "total load" is conceptually acceptable and desirable, particularly if impacts are less than at similar sites.

Adaptive Management
The effectiveness of the proposed source control actions will be fairly easy to assess through monitoring. The changes in the concentration (and thus system pool size/capacity) in the active sediment layer will most likely be impossible to measure even in seemingly long time scales (e.g. 1 decade), as the spatial and temporal variability of the system will make differences difficult to distinguish—it would be useful to do a power analysis.

If you have further questions on these comments, please call me or Dr. Donald Yee at 746-7334.

Sincerely yours,

Dr. Mike Connor,
Executive Director

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A Public Policy and Advocacy Institute

July 14, 2003

Lorreta K. Barsamian
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Dear Ms. Barsamian,

On behalf of Latino Issues Forum, I urge you to work towards stronger and swifter action in addressing the dangerous levels of mercury currently found in San Francisco Bay. Over the past 120 years, low-income communities have seen the bay go from a clean and safe place to fish to a polluted water wasteland. In places where residents once counted on bay fish as a reliable food supply, current day residents are warned not to eat more than two fish per month for fear of mercury poisoning. The working families of the bay area deserve better. They are counting on you to do the right thing and make the bay a safer place.

The Board recently noted in June that mercury " . . . can decrease brain size, delay physical development, impair mental abilities, cause abnormal muscle tone, and result in coordination problems . . . " in children. We know you are concerned with the welfare of children, the elderly and all residents affected by high levels of mercury in the bay.

As a voice for the low-income communities who experience mercury contamination firsthand, we at Latino Issues Forum ask that you revise the present plan and timeline for decreasing mercury levels. Currently, the Board's TMDL for mercury will take too long to significantly reduce mercury levels. According to a recent statement issued by the Board, "By implementing the proposal allocations, the average sediment mercury concentration in the bay will likely drop from about 0.44 ppm to about 0.15ppm, reaching the target of 0.2 ppm after at least 120 years." This timeline is not acceptable.

It *is* possible to drastically reduce mercury levels in the short term. We recommend three key goals. First, halt ongoing bay and delta contamination. Second, remove mercury-containing materials and fuels

from industrial processes and commercial and household goods. Finally, design wetlands restoration projects to reduce methyl mercury production in the Bay and the Guadalupe Watershed.

These are ambitious goals. However, we are confident you will take the leadership initiative to tackle this problem directly. Why should we allow another six generations of our children to bear the mercury burden when we can do something about this problem now? I urge you to make the bay safer for our children today instead of waiting another 120 years to end mercury poisoning. Thank you.

Sincerely,

Luis Arteaga

Luis Arteaga
Executive Director

MEC ANALYTICAL SYSTEMS, INC.
98 Main Street, Suite 428, Tiburon, CA 94920 / (415) 435-1847 / (415) 435-0479 FAX

ACCREDITED IN ACCORDANCE WITH nelac

July 14, 2003

Mr. Bill Johnson
Mr. Richard Looker
San Francisco Bay Regional Water Quality Control Board
1515 Clay Street, Suite 1400
Oakland, CA 94612

SUBJECT: San Francisco Bay Mercury TMDL Project Report Comments

Dear Gentlemen:

MEC Analytical Systems, Inc. has reviewed the Regional Board's Mercury TMDL report, and wishes to commend you and your staff on preparing a highly informative and comprehensive assessment of significant sources of mercury levels present within San Francisco Bay. As ecologists specializing in toxicology and sediment characterization, we agree that dredging in the Bay will result in a net loss of mercury (assuming adherence to the goals of the LTMS), and that the adaptive management policy adopted by the Board should include an emphasis on further evaluation of the bioavailability of mercury on the Bay fringe.

To address the issue of bioavailability, additional reference dose (RfD) studies will be necessary to confirm the validity and practicality of the three mercury target values presented, particularly the target eggshell concentration (due to paucity of available data). However, we believe the most significant factors affecting the transmission of mercury into the food chain will be the development of upland dredged material disposal sites, restored wetlands, and the management of such sites such that the methylation of mercury present in the reused sediments is minimized.

A white paper recently generated by the Engineer Research and Development Center (ERDC) of the U.S. Army Corps of Engineers concluded that wetlands and bermed uplands provide conditions that lead to greater mercury methylation rates relative to either an aquatic environment or an upland site allowed to promptly dry (Lee and McFarland 2002). Based on a review of the available literature (Gardner et al. 1978, Barlett and Craig 1981, Clarke et al. 1988, Hammer et al. 1988, Andersson et al. 1990, Malley et al. 1996, Kannan 1998, Benoit et al. 1999a and b, and Bodaly and Fudge 1999) and studies performed in San Francisco Bay (Olson and Cooper 1976, Simmers et al. 1991, Lee et al. 1992a and b, Lee et al. 1993a-d, and McFarland et al. 1994), Lee and McFarland (2001) assert the following: 1) Sulfide is the primary sediment constituent regulating Hg transformation in sediments, and 2) Optimal conditions for mercury methylation occur in moderately oxic sediments where oxidation occurs at levels high enough to generate a sediment mercury form available to sulphate-reducing bacteria, yet low enough (reducing conditions) to provide the relatively anaerobic conditions necessary for such microbes to function.

MEC has recently performed a small-scale evaluation of mercury methylation rates occurring in three different simulations of upland dewatering conditions using San Francisco Bay sediments. The results appear to validate the conclusions drawn by Lee and McFarland. These circumstances could be of a particular concern when upland sites would require evaporative drying instead of effluent discharge due to projected mercury effluent concentrations that would exceed the Basin Plan's water quality objective (WQO). In this scenario, regulators would be faced with complying with the narrative WQO at the risk of elevating the risk of mercury uptake among organisms residing within the selected upland site.

Although dredging will result in a net loss of mercury from San Francisco Bay proper, achieving the goals of the LTMS through beneficial reuse of sediments in upland disposal sites and restored wetlands may result in an environment with an enhanced potential for transmission of mercury into the biota occupying these areas. Consequently, under the adaptive management policy of the TMDL process, upland and wetlands management practices should be developed to counter the natural processes responsible for optimizing mercury methylation within these settings.

Thank you in advance for consideration of MEC's input. If you would like to discuss the content of these comments or other related issues, please do not hesitate to contact us.

Sincereley,

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References

Andersson, I, Parkman, H., and Jernelov, H. (1990). " The role of sediment as sink or source for environmental contaminants: A case study of mercury and chlorinated organic compounds." *Limnologica* 20,347-359.

Bartlett, P.D., and Craig, P.J. (1981). "Total mercury and methy mercury levels in British estuarine sediments- II." *Water Research* 15, 37-47.

Benoit, J.M., Gilmour, C.C., Mason, R.P., and Heyes, A. (1999a). " Sulfide controls on mercury speciation and bioavailability to methylating bacteria in sediment pore waters." *Environmental Science and Technology* 33, 951-957.

Benoit, J.M., Mason, R.P., and Gilmour, C.C. (1999b). " Estimation of mercury-sulfide speciation in sediment pore waters using octanol-water partitioning and implications for availability to methylating bacteria." *Environmental Toxicology and Chemistry* 18(10), 2138-2141.

Bodaly, R.A., and Fudge, R.J.P.(1999). " Uptake of mercury by fish in an experimental boreal reservoir." *Archives of Environmental Contamination and Toxicology* 37,103-109.

Clarke, J.U., Lutz, C.H., and McFarland, V.A. (1988). " Influences of environmental variables on bioaccumulation of mercury." Technical Note EEDP- 01-14, Environmental effects of Dredging Technical note collection , U. S. Army Engineer Research and development center, Waterways Experimental Station, Vicksburg , Mississippi.

Gardner, W.S., Kendall, D.R., Odom, R.R., Windom, H.L., and Stephens, J.A. (1978). " The Distribution of methyl mercury in a contaminated salt marsh ecosystem." *Environmental Pollution* 15, 243-251.

Hammer, U.T., Merkowsky, A.T., and Huang, P.M. (1988). " Effects of oxygen concentrations on release of mercury from sediment and accumulation by *Ceratophyllum demersum* and *Andonta grandis*," *Archives of Environmental Contamination and Toxicology* 17,257-262.

Kannan, K., Smith, Jr R.G., Lee, R.F., Windom, H.L., Heitmuller, P.T., Macauley, J.M., and Summers, J.K. (1998). " Distribution of total mercury and methyl mercury in water, sediment, and fish from south Florida estuaries." *Archives of Environmental Contamination and Toxicology 34,109-118.*

Lee, C.R. and McFarland, V.A. (2002). "Dredging-Mercury Issues in the San Francisco Bay-Delta Region." Draft White Paper Prepared for the U.S. Army Corps of Engineers, San Francisco District. Engineer Research and Development Center, Waterways Experimental Station; Vicksburg, Mississippi.

Lee, C.R., Brandon, D.L., Tatem, H.E., Slimmers, J.W., Skogerboe, J.G., Price, R.A., Brannon, J.M., Paleromo, M.R., and Myers, T.E. (1992a). "Evaluation of upland disposal of Oakland Harbor, California, Sediment. Volume I: Turning Basin sediments." Miscellaneous Paper EL-92-12. U.S. Army Engineer Waterways Experimental Station, Vicksburg , Mississippi.

Lee, C.R., Brandon, D.L., Slimmers, J.W., Tatem, H.E., Price, R.A., and Miners, S. (1992b). "Evaluation of wetland creation with J.F. Baldwin Ship Channel sediment." Miscellaneous Paper EL-92- . U.S. Army Engineer Waterways Experimental Station, Vicksburg , Mississippi.

Lee, C.R., Slimmers, J.W., Brandon, D.L., Tatem, H.E., Skogerboe, J.G., Price, R.A., and Miners, S. (1993a). "Field Survey of contaminant levels in existing wetlands in San Francisco Bay Area.." Miscellaneous Paper EL-94- . U.S. Army Engineer Waterways Experimental Station, Vicksburg , Mississippi.

Lee, C.R., Brandon, D.L., Tatem, H.E., Slimmers, J.W., Skogerboe, J.G., Price, R.A., Brannon, J.M., Paleromo, M.R., and Myers, T.E. (1993b). "Evaluation of upland disposal of Oakland Harbor, California, Sediment. Volume II: Inner and Outer Harbor sediments." Miscellaneous Paper EL-92-12. U.S. Army Engineer Waterways Experimental Station, Vicksburg , Mississippi.

Lee, C.R., Brandon, D.L., Tatem, H.E., Skogerboe, J.G., Brannon, J.M., Myers, T.E., and Paleromo, M.R.(1993c). "Evaluation of upland disposal of Richmond Harbor, California, Sediment from Santa Fe Channel." Miscellaneous Paper EL-93-18. U.S. Army Engineer Waterways Experimental Station, Vicksburg , Mississippi.

Lee, C.R., Brandon, D.L., Tatem, H.E., Skogerboe, J.G., Brannon, J.M., Myers, T.E., and Paleromo, M.R.(1993d). "Evaluation of upland disposal of J.F. Baldwin Ship Channel Sediment." Miscellaneous Paper EL-93-17. U.S. Army Engineer Waterways Experimental Station, Vicksburg, Mississippi.

Malley, D.F., Stewart, A.R., Hall, B.D. (1996). " Uptake of methyl mercury by the floater mussel, Pyganodon gradis, (bivalvia, Uniondae), caged in a flooded wetland." *Environmental Toxicology and Chemistry* 15(6), 928-936.

McFarland, V.A., Clarke, J.U., Lutz, C.H., Jarvis, A.S., and Mulhearn, J.B. (1994). "Bioaccumulation potential of contaminants from bedded and suspended Oakland Harbor Deepning Project sediments to San Francisco Bay flat fish and bivavle mollusks." Miscellaneous Paper EL-94-7, U.S. Army Engineer Waterways Experimental Station, Vicksburg , Mississippi.

Olson, B.H., and Cooper, N.C. (1976). "Comparison of aerobic and anaerobic methylation of mercury chloride by San Francisco Bay sediments." *Water Research* 10, 113-116.

Simmers, J.W., Lee, C.R., Tatem, H.E., Price, R.A., and Brandon, D.L. (1991)." Evaluation of Wetland Creation with Oakland Harbor California Sediment" Miscellaneous Paper EL- 91, U. S. Army Engineer Waterways Experimental Station, Vicksburg , Mississippi.